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Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6, D.C., so as to arrive at a date not later than 1 August 1955, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in *MILITARY MEDICINE*. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

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MILITARY MEDICINE

ORIGINAL ARTICLES

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Rapid Microbiologic Methodology in Military Medicine*

By

MAJOR ROLAND B. MITCHELL, USAFR (MSC)†

(With one illustration)

MILITARY medicine has achieved outstanding accomplishments in the conquest of infectious diseases among the armed forces. These have resulted in large part from better knowledge of the etiology and epidemiology of various diseases, the establishment of increasingly effective preventive medicine programs, and from outstanding advances in treatment. The constant search for more adequate and faster procedures for care of personnel is a characteristic of military medicine.

One measure of progress in any field of endeavor is practicality. The practical value of microbiology in the solution of military medical problems is directly related to the time required in the performance of necessary tests and procedures. Three to five days as a minimum is required for many laboratory examinations performed by the usual microbiologic techniques. Most infectious diseases can be diagnosed reliably only on the basis of laboratory findings. Too often, laboratory reports on specimens submitted for microbiologic analysis are returned to the clinician after his patient has been discharged from the hospital or has become "quartermaster property." Early reports to the physician from the laboratory will aid

him in his decisions on treatment and control.

A rapid microbiologic methodology, for medical problems in both the military and civilian populations, is of definite value in maintaining our manpower and consequently our military strength. In these days it is conceded that total war eliminates much of the differentiation between military and civilian contributions to a war effort. Both military and civilian personnel are included in the over-all manpower unit, and it is the continuing availability of this unit that largely determines our success in war. Thus, any threat to the health, efficiency or endurance of civilian personnel also is a threat to the health, efficiency and endurance of our military personnel.

During the past twelve years the author and his collaborators have explored the possibility of developing, modifying, and utilizing rapid, simplified procedures to increase the practical value of microbiologic methodology in the control of infectious diseases. These procedures are designed to provide military medicine with an effective means for early diagnosis of infectious diseases, quick curtailment of epidemics, and a timely medical defense against biologic warfare.

Certain difficulties are inherent in most of the microbiologic procedures used to detect and identify pathogenic microorganisms. Most microorganisms cannot be identified by their morphological characteristics alone. In

* Honorable Mention, the 1954 Sir Henry Wellcome Medal and Prize competition.

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fact, many of them, such as viruses, cannot be seen with the standard microscope. The need to include many cultural, biochemical, and serological characteristics has made the identification of microorganisms a time-consuming procedure. Another main difficulty is that these many and varied tests are costly in both material and personnel. The traditional techniques have become so involved that highly skilled technicians are required to perform them; the amount of time they spend on the tests has greatly increased; and the equipment and material they use are expensive. As a result, it is extremely difficult to obtain adequate microbiological diagnoses in military and civilian hospitals where the volume of laboratory work is small. Yet the greater part of our medical care is initiated and completed in these relatively small facilities. For these reasons it has seemed to the author desirable to develop a battery of simplified and rapid microbiologic techniques for practical use.

Our approach to the problem has been: (a) to develop or modify selected tests and techniques, (b) to evaluate their reliability under field conditions, and (c) to apply the proved tests or techniques in practice. As these methods become available, they are incorporated into schemata for the rapid microbiological analysis of various pathogenic organisms. Recent experience has shown that many of these analyses can be done in a small fraction of the time required by the techniques usually employed. In many ways, the traditional methods are comparable to a standard cross-cut saw that will topple many kinds of trees when enough manpower is applied over a long period of time. An adequate rapid microbiologic method is more like a power-driven chain saw, which will do the same job in a fraction of the time with much less manpower.

Rapid methods have been developed, modified, and evaluated for the detection, isolation, and identification of the causative agents of certain bacterial, mycotic, and viral infections. Our investigations have included studies of culture media, rapid biochemical

tests, serologic tests, spectrophotometric analyses, the development of procedures to collect suitable specimens for analysis, studies of the antibiotic susceptibility of microorganisms, and the preparation of schemata for the rapid isolation and identification of selected etiologic agents of infectious diseases which are particularly important in military medicine. These methods have been evaluated under field conditions both within and outside of the continental limits of the United States.

Examples of the progress made in the field of rapid microbiologic methodology are presented in discussions of the procedures as they are applied to selected medical problems of importance in the Armed Forces. These include enteric infections, streptococcus infections, external ear infections, infections of the urinary tract, blood-stream infections, the cultural diagnosis of tuberculosis, and procedures for the study of viruses. The development of so many new strains of pathogenic microorganisms which are resistant to antibiotics has made it imperative that these agents be detected, identified, and defined as to their antibiotic susceptibility as early as possible. For this reason, the progress made in devising a rapid methodology to determine the susceptibility of bacteria and fungi to selected antibiotics and to other chemotherapeutic agents is discussed.

MICROBIOLOGIC METHODOLOGY

Enteric Infections

The bacteriological diagnosis of enteric infections has received considerable emphasis in our program because these infections continue to be a problem in the Armed Forces and at times become a major medical cause of noneffectiveness in military personnel. This is particularly true in countries or geographic areas where enteric infections are highly endemic. Entire military units have been inactivated (as far as combat is concerned) by sudden diarrhea. Rapid microbiologic diagnosis of enteric infections thus is of the utmost importance to the medical departments of the military services.

The distribution of our forces over the world means that too often an outbreak of enteric disease occurs at a point far removed from a large diagnostic laboratory. Consequently, the initial work must be done in relatively small laboratories which are situated close to the problem. Seldom is an adept bacteriologist available in such a laboratory; of necessity the work falls on the shoulders of technicians.

For this reason, a schema has been prepared, outlining the rapid microbiologic techniques required to study enteric pathogens.¹¹ It is designed as a practical guide for field studies, for small laboratories, and for technicians of limited experience with the enteric pathogens. The techniques have been evolved from comparative studies by the author and his collaborators in the Armed Forces^{1, 2} and in public health laboratories;^{8, 9} from experiences with extensive outbreaks of enteric infections in Korea¹² and inside the continental limits of the United States;^{25, 26} and from examination of personnel recently returned to the United States from overseas.⁴²

Using these rapid methods, it is possible to isolate and identify an enteric pathogen, such as *Salmonella* or *Shigella* as early as 24 hours after the specimen arrives in the laboratory. This is the saving of 2 to 3 days over the time required by the techniques usually employed in many laboratories.

Streptococcus Infections

The enhanced spread of communicable disease by migration of persons or groups has long been recognized. As a result of increased travel and the concentration of personnel during military operations, epidemic strains of the causative agents of various diseases commonly develop and are disseminated.

Because of the frequent and obvious transfer of communicable disease between different military installations, a study of this problem was initiated. Since one of the major causes of serious communicable infections had been the hemolytic streptococcus, attention was directed primarily to the dis-

eases produced by this organism and to the spread of individual strains of the Group A hemolytic streptococci among selected military installations.

Little information was available at the onset of this study regarding the geographic distribution of the various types of Group A hemolytic streptococci, or the frequency of their occurrence in throat cultures of healthy military personnel. Preliminary orientation studies were therefore conducted. It soon became obvious that, in order to obtain the information required, a rapid and reliable microbiologic and epidemiologic methodology must be developed. Methods were selected to determine the normal carrier incidence of beta hemolytic streptococci among personnel transferred by troop train from training detachments to a western air base, and these methods were evaluated on the basis of requirements within the military organization. They included obtaining specimens and processing them. The culture and serologic procedures required to identify the groups and types of streptococci encountered have been prepared.¹⁶

In the preliminary studies, 73 different troop units, comprising a total of 5,828 men, were examined. In 48 of the units, carrier rates for beta hemolytic streptococci of 20 per cent or higher were observed. Rates of 30 to 50 per cent were not uncommon. Of the hemolytic streptococci isolated, 85.7 per cent were found to belong to Lancefield Group A. The serological types most commonly encountered were types 1, 3, 6, 14, 17, 19, 30 and 36. Types 4, 5, 8, 10-12, 11, 13, 24, 25, 26, 28, 29, 37, 40, 41, and 44 were less frequently found.^{17, 20, 30}

Studies were made to determine the increase in beta hemolytic streptococcus carriers among personnel during troop train movements from areas of high and low incidence of respiratory diseases to areas of the same or different disease incidence.^{18, 31} These investigations required suitable methods to obtain and store throat swabs from personnel during periods of several days aboard trains. It was determined that sterile

cotton-tipped swabs, dipped into sterile brain-heart infusion broth, were adequate to obtain throat swab specimens. All throat swabs were placed in a portable dry-ice refrigerator immediately after collection, and were stored until they could be used to inoculate blood agar culture plates and tubes of enrichment media. A total of 500 specimens could be refrigerated and transported in a portable dry-ice box.

After storage in this manner for periods as long as nine days, beta hemolytic streptococci could be successfully subcultured from positive throat swabs and/or swab cultures. An additional investigation was made to determine the feasibility of transporting the freshly isolated cultures long distances by air. For this study 125 cultures were inoculated onto sterile cotton-tipped swabs, and packed over 20 pounds of dry ice in a small dry-ice refrigerator, consisting of a corrugated cardboard box lined with three additional layers of cardboard. This package was transported by commercial air from Florida to California. The tests for viability and the serological identity determined for each of the cultures were identical in the California and Florida Armed Forces medical laboratories.

Results obtained from these studies indicated that there is a tendency for beta hemolytic streptococcus carrier rates to increase during extended troop movements. In one four-day movement of 144 men from Colorado to Florida in early January, 13 showed positive cultures for the beta hemolytic streptococci at the time of entraining. During the trip 44 had positive throat cultures. At the time of detraining, 16 still carried the streptococcus. Another study was made of 265 men who were moved in late December from New Jersey to Mississippi. At the time of entraining 8 showed positive beta hemolytic streptococcus throat cultures. On arrival, two days later, the number had increased to 32.

When highly communicable strains were present, much greater dissemination occurred than is normally observed at fixed military installations.^{21, 29, 30} Using the microbiologic

and epidemiologic methodology established during the pilot studies, it was possible to follow the inter-post dissemination of a specific strain of hemolytic streptococcus. This opportunity arose when a highly communicable, sulfadiazine-resistant, and penicillin-susceptible strain of Group A, Type 17 hemolytic streptococcus appeared at a military base. The epidemic was tracked as it passed from personnel at the first installation to those at other bases.^{19, 20, 28}

These studies, with related ones in which improved microbiologic methodology was employed, emphasized the fact that improvement in the control of upper respiratory infections depends upon a wider knowledge of their epidemiology and of the characteristics shown by the etiologic agents that cause them.^{28, 30}

External Ear Infections

In recent years the importance of external ear infections as a disease entity has been increasingly recognized. Otitis externa occurred with disturbing frequency among troops in the South Pacific. According to Gordon,¹⁹ it ranked second on Guam among illnesses causing loss of time from duty. Nelson³¹ reported that 50 per cent of the cases seen in the practice of otolaryngology in the South Pacific were otitis externa. Sometimes the incidence was as high as 70 per cent. Its frequent occurrence among military personnel during the hot, humid summer months has been emphasized by many observers in widely scattered localities. Otitis externa is an acknowledged problem of military medicine.

This situation has stimulated the effort to obtain more exact knowledge of the types of microorganisms associated with the condition. New therapeutic measures and simplified, rapid antibiotic susceptibility tests are now available. They give hope that specific and/or a more effective therapy may be found, if etiological diagnoses can be established quickly and if the responsible microorganisms respond satisfactorily to the available therapeutic agents. Rapid microbiologic

TABLE 1
BACTERIOLOGIC FINDINGS IN CULTURES OF NORMAL AND INFECTED EXTERNAL
AUDITORY CANALS OBTAINED DURING 1951-1953

	Number and Percent of Cultures Positive for Specific Organisms			
	In Infected Ears 3,708		In Normal Ears 3,577	
	Number	Percent	Number	Percent
<i>Pseudomonas</i> group	2,470	66.6	43	1.2
<i>Proteus</i> group	272	7.3	10	0.3
<i>Coli-aerogenes</i> group	962	25.9	162	4.5
<i>Alcaligenes</i> group	168	4.5	46	1.3
<i>Paracolon</i> group	43	1.2	7	0.2
<i>Streptococci</i> , alpha type	120	3.2	28	0.8
<i>Streptococci</i> , beta type	122	3.3	2	0.1
<i>Streptococci</i> , gamma type	328	8.8	530	14.8
<i>Staphylococcus albus</i> , hemolytic	1,141	30.8	2,221	62.1
<i>Staphylococcus albus</i> , nonhemolytic	572	15.4	1,532	42.8
<i>Staphylococcus aureus</i> , hemolytic	413	11.1	152	4.2
<i>Staphylococcus aureus</i> , nonhemolytic	147	4.0	123	3.4
<i>Staphylococcus citreus</i>	18	0.5	74	2.1
Chromogenic soil organisms	26	0.7	34	1.0
Aerobic spore formers	65	1.8	200	5.6
Diphtheroids	113	3.0	595	16.6

procedures which would adequately define the microorganism content of specimens obtained from both normal and diseased external ears were selected.^{36, 41}

During the summer and fall months of 1951, 1952, and 1953 we examined bacteriologically and mycologically 3,577 cultures of the normal and 3,708 cultures of the diseased external ear.^{36, 37, 41, 43} Specimens were obtained from military personnel at two bases in Florida and one in Texas. Evidence derived from the improved microbiologic methodology mentioned above indicates that, under the conditions existing at these bases, during these seasons, and in these subjects, infections of the external ear are predominantly caused by gram-negative bacilli.

The bacteriologic findings on cultures of normal and infected external auditory canals are presented in Table 1. The mycological flora, so often reported in earlier literature as the cause of otitis externa, appear to have limited significance, if any. Results obtained in these studies support the reports of gram-

negative microflora, with particular emphasis on the prominent role of the *Pseudomonas* species. Reports in the literature and our own observations^{13, 24, 36, 37, 41, 43} led to the opinion that, under certain defined conditions in the external ear, organisms not usually considered as pathogens—particularly gram-negative bacilli other than *Pseudomonas*—multiply freely and appear to have etiologic importance.

In vitro determinations were made of the antibiotic susceptibility of 1,904 isolations of bacteria from infections of the external auditory canal. Eight therapeutic agents were selected for testing. They included penicillin, aureomycin, chloromycetin, terramycin, polymyxin, dihydrostreptomycin, sulfadiazine, and sulfamylon. The results of these tests are presented in Table 2. Simplified, rapid testing procedures for antibiotic susceptibility were employed.^{24, 37, 39}

For the *Pseudomonas* species, all agents tested except penicillin apparently were effective to some degree. Terramycin particularly

TABLE 2
SUSCEPTIBILITY REACTIONS TO EIGHT THERAPEUTIC AGENTS OF 1,904 MICROORGANISMS ISOLATED
FROM INFECTED EXTERNAL AUDITORY CANALS

Organisms	Total	Penicillin			Aureomycin			Chloromycetin			Terramycin			Polymyxin			Sulfadiazine			Sulfamylon			Dihydro-streptomycin		
		S	R	NT	S	R	NT	S	R	NT	S	R	NT	S	R	NT	S	R	NT	S	R	NT	S	R	NT
<i>Pseudomonas</i> sp.	666	0	637	9	243	422	1	224	442	13	624	42	—	173	10	463	524	142	—	189	54	423	64	359	243
<i>Proteus</i> sp.	60	0	60	—	0	60	—	11	48	1	2	58	—	0	6	54	7	53	—	0	7	53	17	36	7
<i>Aerobacter</i> sp.	245	0	245	—	172	71	2	160	82	3	232	13	—	44	16	185	26	219	—	5	66	174	132	42	61
<i>Escherichia</i> sp.	52	0	52	—	38	13	1	39	13	—	49	3	—	7	6	39	2	50	—	2	11	39	25	14	13
<i>Atcaligenes</i> sp.	59	0	57	2	50	9	—	15	44	1	46	13	—	11	5	43	49	10	—	3	13	43	18	25	16
<i>Streptococci</i> , alpha type	44	16	28	—	42	2	—	33	11	—	41	3	—	1	21	22	6	38	—	3	19	22	4	18	22
<i>Streptococci</i> , beta type	33	25	8	—	32	1	—	24	9	—	30	3	—	0	8	25	8	25	—	4	4	25	2	23	8
<i>Streptococci</i> , gamma type	63	14	49	—	56	7	—	28	35	—	55	8	—	0	13	49	4	59	—	0	14	49	6	43	14
<i>Staphylococcus albus</i> , hemo-lytic	370	237	130	3	297	69	4	291	65	14	288	79	3	72	91	207	18	195	—	47	149	174	153	21	196
<i>Staphylococcus albus</i> , non-hemolytic	110	67	42	1	100	10	—	80	27	3	101	8	1	12	15	83	12	27	—	5	24	81	71	10	29
<i>Staphylococcus aureus</i> , hemolytic	125	73	52	—	119	5	1	75	27	13	120	5	—	22	30	73	12	113	—	14	47	64	56	8	61
<i>Staphylococcus aureus</i> , non-hemolytic	42	24	18	—	39	3	—	33	9	—	39	3	—	1	1	40	8	34	—	0	2	40	32	8	2
Yeast-like organisms	35	0	35	—	0	35	—	0	35	—	0	35	—	0	16	19	0	35	—	0	16	19	0	19	16

S—Susceptible

R—Resistant

NT—No test made

gave good results. It was effective against 624 of the 666 *Pseudomonas* cultures tested. Five antibiotics showed good in vitro results with the *Aerobacter* and *Escherichia* cultures. These were terramycin, aureomycin, chloromycetin, polymyxin, and dihydrostreptomycin. Aureomycin, sulfadiazine, and terramycin appeared to be of value against *Alcaligenes*. None of the agents seemed to show any outstanding effect on the *Proteus* organisms. For the streptococci and staphylococci as a group, penicillin, aureomycin, chloromycetin, and terramycin showed the most promising effects. The yeast-like organisms were not affected by any of the agents tested.

These results emphasize that bacteria isolated from external ear infections will vary tremendously from strain to strain within a given species as to their susceptibility to antibiotics. Variance in susceptibility was noted particularly with *Pseudomonas* organisms. Since they are among the most frequent invaders of this nature, found in 65 to 70 per cent of external ear infections, rapid microbiologic assistance is extremely advantageous.

Urinary Tract Infections

Early identification of the causative organisms can be of aid to the clinician in the diagnosis and treatment of urinary infections. Information concerning the susceptibility of the etiologic agents to antibiotics is required. The idea that a certain type of microorganism is always susceptible to a selected antibiotic is erroneous; different strains of the same microorganism may exhibit entirely different sensitivity reactions.

The development and evaluation of a rapid microbiological methodology has resulted in a schema for microbiologic analysis of urine specimens, providing fast and reliable answers as to the identity and antibiotic susceptibility of microorganisms isolated from urine cultures.¹⁵ In this report two systematic aids are provided: (a) for the physician, a review of the procedures which can give him the information he needs quickly and accurately, and (b) for the technician, an outline

TABLE 3
RELATIVE DISTRIBUTION OF 1,216 ORGANISMS
ISOLATED FROM 858 POSITIVE
URINE SPECIMENS

Organism	Occurrence in specimens	
	Number	Percent
<i>Pseudomonas</i> sp.	478	56.4
<i>Aerobacter aerogenes</i>	143	16.9
<i>Escherichia</i> sp.	168	19.8
<i>Alcaligenes</i> sp.	76	9.0
Paracolon type 29911	46	5.4
Paracolon sp.	20	2.4
<i>Proteus</i> sp.	101	11.9
Alpha-type streptococci	18	2.1
Beta-type streptococci	19	2.2
Gamma-type streptococci	33	3.9
<i>Staphylococcus aureus</i> , hemolytic	16	1.9
<i>Staphylococcus aureus</i> , non-hemolytic	12	1.4
<i>Staphylococcus albus</i> , hemolytic	37	4.4
<i>Staphylococcus albus</i> , non-hemolytic	36	4.3
<i>Staphylococcus citreus</i> , hemolytic	1	0.1
Yeastlike organisms	12	1.4

of procedures which will yield the most information in a short time. They are presented in a sequence which has been shown to save both time and effort. These methods have been employed to study the identity of 1,216 microorganisms, isolated from 848 urine specimens submitted to the laboratory for microbiologic analysis. The types and distribution of the organisms are presented in Table 3.

Many of the urine specimens contained more than one kind of organism. Gram-negative bacilli accounted for 1,032 isolations, 172 were gram-positive cocci, and 12 were yeast-like organisms. The predominant organisms were *Pseudomonas*. These accounted for 478 of the 1,032 gram-negative bacilli. With the use of antibiotics in infections of the urinary tract, there has occurred a change in the type of organism usually found. A possible explanation is that therapeutic agents which are effective against the microorgan-

isms generally encountered may have little or no effect on the *Pseudomonas*. As so often is the case in mixed infections, the elimination of one organism by an antibiotic will permit the rapid multiplication of another organism which is not susceptible to the therapeutic agent employed. It is noted that coli-aerogenes organisms were commonly found as the predominating organisms in urine specimens obtained before treatment. *Proteus* species were third in occurrence, with 101 isolations, and *Alcaligenes* species followed, with 76. Paracolon organisms, often found in the intestinal tract, accounted for the remaining 66 isolations of the gram-negative bacilli.

Streptococcus species were identified in 70 of the 172 isolations of gram-positive cocci. Of the 102 isolations of *Staphylococcus* species, 28 were identified as *Staph. aureus*, 73 as *Staph. albus*, and 1 as *Staph. citreus*.

The identities and reactions of these microorganisms to seven therapeutic agents are described.^{38, 39} The sensitivity reactions of the 1,216 organisms are shown in Table 4. From these results, the relative effectiveness of the therapeutic test agents for particular groups of organisms can be seen. Terramycin, sulfadiazine, aureomycin, and neomycin appeared to be most effective against members of the *Pseudomonas* and *Alcaligenes* groups, while terramycin, chloromycetin, neomycin, and aureomycin had the most favorable action upon the coli-aerogenes group. The organisms which were most resistant to the agents tested were members of the *Proteus* group and paracolon type 29911. Neomycin appeared to be the most active against *Proteus* sp., showing some degree of inhibition for 47 of the 101 organisms isolated and tested. Chloromycetin was the most effective against the paracolon type 29911, inhibiting 10 of the 46 organisms.

For the streptococci isolated, terramycin and aureomycin showed the most favorable action. *Staph. aureus* and *Staph. albus*, both hemolytic and nonhemolytic, were inhibited by all the therapeutic agents with the exception of sulfadiazine. Dihydrostreptomycin and neomycin showed the most favorable

action against hemolytic *Staph. albus*, while terramycin and neomycin appeared to be the most active against non-hemolytic *Staph. albus*. Few yeast-like organisms were isolated. For the 12 that were, none of the agents tested showed the slightest inhibitory effect.

The microorganisms isolated from the specimens studied are those usually found in urinary tract infections. One point of interest is the occurrence of *Pseudomonas* sp. and *Proteus* sp. in so many of the urine specimens. These have been shown to be among the organisms which are most refractory under treatment with antibiotics.

Bacteriologic examinations, including in vitro susceptibility determinations, are valuable aids to the clinician in the treatment of urinary tract infections. This is particularly evident when the infectious agents are of the more resistant varieties, such as *Proteus* sp., paracolon type 29911, and the yeast-like organisms. From the results in Table 4 it would appear to be a relatively simple task to select the proper therapeutic agent on the basis of the identification of the etiologic agent.

Unfortunately, strains of a particular organism, as we noted above, may differ greatly in their reactions to various antibiotics. It is known that many organisms may be normally resistant or may have enhanced resistance, after previous exposure to certain therapeutic agents. When a resistant organism is found before or after the use of a selected antibiotic, it is obvious that this particular therapeutic agent will be of little or no value. Bacteriologic examinations, including susceptibility tests, can help the clinician in his etiologic diagnosis and in selecting suitable antibiotics to treat urinary tract infections.

Blood Stream Infections

The need for a more rapid and sensitive technique to test blood cultures for suspected bacteremia and septicemia is emphasized when the attempt is made to choose a standard procedure. No single adequate standard method for blood culture is in use throughout the field of clinical bacteriology.

This problem was placed in the hands of a

TABLE 4
IN VITRO REACTIONS OF 1,216 MICROORGANISMS, ISOLATED FROM 848 URINE SPECIMENS, TO SEVEN THERAPEUTIC AGENTS

Microorganisms	Total isolations	Aureomycin		Chloromycetin		Dihydrostreptomycin		Neomycin		Penicillin		Terramycin		Sulfadiazine	
		S	R	S	R	S	R	S	R	S	R	S	R	S	R
<i>Pseudomonas</i> sp.	478	167	311	82	396	43	435	163	315	0	478	441	37	184	294
<i>Aerobacter aerogenes</i>	143	96	47	115	28	73	70	106	37	0	143	130	13	9	134
<i>Escherichia</i> sp.	168	117	51	128	40	87	81	143	25	2	166	163	5	33	135
<i>Alcaligenes</i> sp.	76	48	28	11	65	15	61	59	17	0	76	66	10	53	23
<i>Paracolon</i> 29911	46	1	45	10	36	2	44	6	40	1	45	3	43	3	43
<i>Paracolon</i> sp.	20	12	8	11	9	10	10	16	4	0	20	12	8	10	10
<i>Proteus</i> sp.	101	18	83	22	79	16	85	47	54	0	101	29	72	3	98
Alpha-type streptococci	18	16	2	11	7	0	18	1	17	9	9	15	3	1	17
Gamma-type streptococci	33	30	3	18	15	3	30	5	28	8	25	29	4	2	31
Beta-type streptococci	19	14	5	14	5	1	18	0	19	9	10	12	7	1	18
<i>Staphylococcus aureus</i> , hemolytic	16	12	4	12	4	13	3	14	2	8	8	14	2	2	14
<i>Staphylococcus aureus</i> , nonhemolytic	12	10	2	12	0	7	5	12	0	2	10	9	3	2	10
<i>Staphylococcus albus</i> , hemolytic	37	24	13	28	9	31	6	35	2	18	19	25	12	6	31
<i>Staphylococcus albus</i> , nonhemolytic	36	28	8	29	7	24	12	34	2	20	16	31	5	5	31
<i>Staphylococcus citreus</i> , hemolytic	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Yeastlike organisms	12	0	12	0	12	0	12	0	12	0	12	0	12	0	12

S—Sensitive.

R—Resistant.

contract investigator. A procedure now is available using gastric mucin as an adjuvant in routine clinical blood culture.⁶ In a series of cultures, the mucin broth gave a considerably larger number of positive results than the usual nutrient broth; the cultures grew out more rapidly and more luxuriantly than with plain broth.⁷

At the present time a study is under way on the use of the membrane filter to determine the presence and identity of bacteria in circulating blood.⁴⁰ There are indications that a technique will be found. This will make available a faster method for microbiological analysis of blood stream infections.

Cultural Diagnosis of Tuberculosis

The approach to the problem of tuberculosis in the Armed Forces must continue to emphasize an enlightened program of prevention as well as clinical therapy. Both aspects call for assistance from the microbiologist in etiologic diagnosis and in determining the progress of treatment. Too often the laboratory is faced with two distinct problems in making microbiologic tests for the tubercle bacillus in different types of clinical specimens: (a) the volume of work is extremely heavy for the personnel available, and (b) it is often necessary to process specimens that have been in transit to the laboratory for several days.

The objective of these studies has been to provide reliable direction in the formulation of faster, simplified procedures in the bacteriological diagnosis of tuberculosis. Adaptations and improvements of various techniques have been made, enabling the laboratory to process large numbers of sputum specimens with accuracy and—which is just as important—with greater safety to the laboratory's own personnel. Some of these techniques are now described in a technical manual, "Methods for Medical Laboratory Technicians."³⁵

In the present investigations, the culture and staining methodology was evaluated for the examination of large numbers of sputum specimens submitted for bacteriological diagnosis. The use of a sodium hypochlorite

solution (Clorox) to digest the sputum, and the addition of sodium thiosulphate to the clorox-sputum mixture after 5 minutes to terminate the action of the clorox, results in microscope slide preparations with a greater concentration of acid-fast bacilli than have been noted with any of the other procedures employed in the study. Rapid, acid-fast staining with Tergitol No. 7, as a penetrating agent for carbol fuchsin stain, gives results comparable to the technique usually employed, and provides an answer in a fraction of the usual time.

Trisodium phosphate solution, in the bottles used to collect specimens from suspected cases of tuberculosis, digested and decontaminated the specimens before they arrived at the laboratory. These specimens can be used to inoculate the culture media and to prepare suitable smears for staining without further manipulation, other than centrifuging.²⁷ These techniques require minimum handling of the specimens. They are simple, and permit analyses on a mass basis. They are both reliable and safe, so far as laboratory personnel are concerned, for the microbiologic diagnosis of tuberculosis in military and civilian hospitals, and in public health laboratories.

Viral Infections

Viral infections, which induce an incisive clinical syndrome, must depend on the detection of antibodies in convalescent specimens, or on non-specific tests for diagnosis. The treatment of viral infections, if available, is most effective when it is administered during the acute stage of the illness. However, without a well-developed diagnostic technique, therapy is generally delayed until convalescence, and therefore is dispensed with.

The level of virus in the infected host is thought to be highest during the acute stage. The concept was that if the virus could be concentrated sufficiently to be used as an antigen, the specific infection might be diagnosed within 24 hours. Such rapid diagnosis is warranted by the benefit to the patient from early therapy, and by the benefit to the

community from an early institution of preventive measures to abort an outbreak of disease.

This problem has been approached through a contractual monitorship. Admittedly, the problems in laboratory diagnosis of viral infections are far from solved. Some progress is pertinent to the over-all problem, and so can be reported as an indication of the means by which faster and more reliable microbiologic methodology may be developed in this particular field.

One such study³³ dealt with the serologic reactions in serum hepatitis. The purpose was to develop faster methods to identify agents which cause the condition and which are difficult to recognize by methods now available. A specific complement fixing antigen was found in serum from a case of the early acute phase. The antigen survived storage at -20°C . for at least one month, and survived heat at 61°C . for 20 minutes. It retained its antigenic properties when diluted 1:4. The antigen did not fix complement with serums from cases of infectious hepatitis or obstructive jaundice (neoplastic obstruction plus congenital biliary atresia). Serum hepatitis complement fixing antibodies were detected in serums collected from 13 to 150 days after the onset of illness.

Should the findings from this study be confirmed, a serum hepatitis infection might be diagnosed during its early stages by using the patient's own serum as a complement fixing antigen, with known positive and negative antisera. The result would be a suitable rapid method to detect the infection in its early phase by a technique already applied routinely in laboratories. Studies are in progress to determine the possibility of detecting other viruses in the early acute stage by this method.

Infrared absorption spectra of suitably prepared viral preparations indicate that the technique may have definite value in determining the taxonomic place of viruses for which specific laboratory procedures are now lacking.³⁴ Such spectra have been determined for the viruses of meningopneumonitis, ornithosis, mumps, and Newcastle dis-

ease. The spectra of mumps and Newcastle disease are distinctly different from those of meningopneumonitis and ornithosis. On the other hand, the spectra of the latter two agents seem to indicate a close similarity. Investigation continues on this problem.

Studies of the influence of viral agents on tumor implants in tissue culture have been made, in the hope of finding a relatively rapid method by which a wide range of viruses can be examined for their effect on human tissues. The studies might also provide a means to isolate and propagate viral agents to which conventional laboratory animals are refractory.³²

It was determined that tumor implants, growing in roller type cultures, demonstrated a marked oncolytic response to St. Louis encephalitis infection. Two human and two rodent tumors were destroyed completely by this virus, while they reacted less completely to neurotropic influenza virus. Infections with Lansing poliomyelitis, Newcastle disease, herpes, and influenza A viruses adapted to chick embryo did not interfere with growth of tissue implants. Rabies virus appeared to stimulate the growth of such tumor implants. This technique may have potential value as a survey tool with which to determine quickly the cytopathogenic effect of viral agents on tumors, and as a means of isolating and identifying human pathogens which have not been transmitted to experimental animals.

Studies are now under way to develop and evaluate a microbiologic methodology for manipulation of the etiologic agent(s) of the common cold infection. When this information is obtained the disease can be studied more accurately and methods can perhaps be developed to prevent the infection. Under present circumstances, this infection has not been amenable so far to a conventional approach, and may not be in the future.

Rapid Determination of Antibiotic Susceptibility of Microorganisms

Over the ten years that antibiotics have been readily available for treatment, physicians have encountered an increasing number of infections caused by resistant strains of

microorganisms. Penicillin has engendered a steadily rising percentage of resistant staphylococci. More recently, even the broad spectrum antibiotics are encountering strains of microorganisms resistant to them. Because of this fact it has been the practice to rely upon the microbiological laboratories to determine the susceptibility of microorganisms in cases where a prompt response was not obtained to the antibiotic being used. Studies were initiated to develop and evaluate rapid procedures to determine antibiotic susceptibility in vitro of pathogenic bacteria and fungi.^{22, 24, 39} Several methods were tested and/or evaluated in our laboratory by means of time-lapse photography, in order to find how long it took for definite reactions to occur, indicating either susceptibility or resistance to one or more of the available antibiotics.

It soon became evident that one of the widely accepted methods—an agar diffusion technique using filter paper discs impregnated with antibiotics—offered great promise for adaptation as an adequate fast technique. By modifying this procedure a test was secured for bacterial susceptibility in which the results could be read in approximately 6 to 8 hours. The method was particularly effective in determining the susceptibility of *Pseudomonas aeruginosa* and other organisms encountered in infections of the skin, including external ear infections and those of a burned surface. A motion picture was made by time-lapse photography to teach this technique. It has been shown as an exhibit at several scientific meetings.

Although this procedure had many advantages over the usual techniques, which required overnight incubation before a report could be made to the physician, it still took much too long to furnish the rapid information that we considered necessary, if we were to do our best for the patient. In recent months a new method has been developed. This reduces the time required for determination of antibiotic susceptibility to as little as two hours.¹⁴ The method uses hemoglobin indicator to detect the antibiotic

susceptibility of microorganisms. The reactions with this procedure are easily read; culture media and glassware commonly found in the laboratory are employed; and no complex manipulations are required. Hence, the procedure is one that may be used with ease in the laboratory of any military or civilian hospital.

The simple steps required to perform this rapid test are shown in Figure 1. They are carried out in the following sequence:

a. The inoculum (clinical material or bacterial culture) is suspended and mixed thoroughly in 5 ml. of melted and cooled brain heart infusion agar containing 0.8 per cent dextrose (*seed layer*).

b. This seeded agar is poured immediately into a flat bottomed petri dish containing a thin solidified layer (5 ml.) of heart infusion agar plus 20 per cent citrated whole human blood (*base layer*—hemoglobin indicator).

c. Antibiotic sensitivity discs are pressed firmly on the surface of the inoculated seed layer.

d. The plate is incubated at 37° C. and checked at 30-minute intervals for the occurrence of *zones of inhibition of hemoglobin reduction* surrounding the antibiotic sensitivity discs.

The *base layer* plates and tubes of *seed layer* agar can be prepared in advance and kept on hand.

Visible growth is the basis of the usual test of antibiotic susceptibility or resistance tests. Before it appears, the metabolic activities of most strains of bacteria produce relatively intense reducing conditions within the medium. In the most recently developed test these conditions are reflected in a reduction of hemoglobin and a characteristic change of the blood's color from bright red to a purplish red. This change can be seen in the base layer as shown in Figure 1. Zones in which hemoglobin reduction is inhibited surround the discs containing the active antibiotics. They are similar in size to those measured by the inhibition of visible growth after further incubation of the inoculated plate, or on control plates inoculated by the

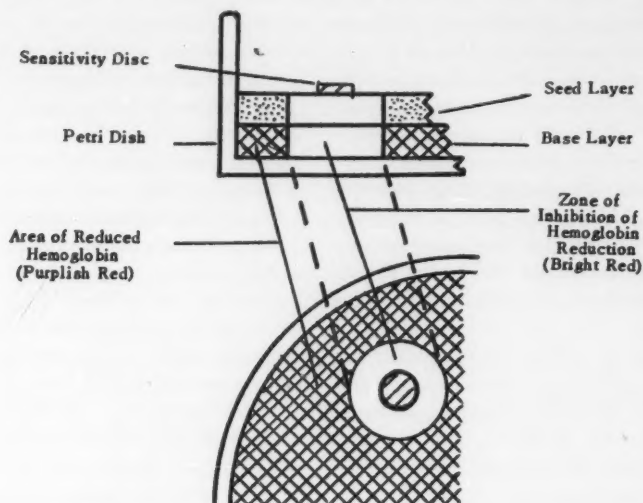


FIG. 1. Antibiotic susceptibility testing procedures (hemoglobin reduction method).

conventional surface-streaking procedure.

The incubation period needed to reduce the hemoglobin sufficiently, or the visible growth necessary to indicate clearly the zones of inhibition around the discs containing the antibiotics, varies with the nature of the test organisms and/or the size of inoculum. The zones of inhibition on any given plate can generally be measured by the hemoglobin reduction method in approximately one-half the time it takes for visible growth to appear. Tests with the heavy inocula of bacteria commonly encountered in clinical specimens and in pure cultures may be read in two hours by the hemoglobin reduction method.

A color film also has been made of the relatively simple technical steps employed in this rapid testing procedure. Time-lapse photography again was used to show the changes of color on the test culture plates as reactions to the antibiotics occurred. The viewing time is three minutes.

It was considered desirable to try out this procedure on cultures obtained directly from the patient, without first isolating the organisms. The purpose was to learn whether the laboratory could provide the clinician with information on the susceptibility of the pre-

dominating organism even before its identity was known, and in time to help him select the proper antibiotic for treatment. This work was done in a small laboratory, set up as a separate unit within a comparatively large military hospital. The evaluation showed that the rapid hemoglobin reduction test for antibiotic susceptibility predicted a response to the antibiotics employed as favorable as that of standard tests, and in a much shorter time.⁵

This method is undergoing further comparison with other testing procedures. It is being subjected to both laboratory and clinical evaluation on infections encountered in dermatology and surgery (plastic surgery and burn wounds) and also in a large State public health laboratory. In our own laboratories we are attempting to develop even faster and more adequate methodology to determine the antibiotic susceptibility of various pathogenic microorganisms. The aim of this research is to provide the military physician with the information he requires as rapidly as possible.

Additional methods have been developed to determine the susceptibility of pathogenic fungi to selected chemotherapeutic agents.

Such in vitro tests of susceptibility have been used to screen large numbers of drugs, in order to select and identify those which have promising fungistatic activity.^{22,23} This test has been employed in studies of susceptibility to antihistaminic and anticholinergic compounds of *Coccidioides immitis*, *Trichophyton mentagrophytes*, *Microsporium canis*, *Microsporium gypseum*, *Monosporium apiospermum*, *Phialophora verrucosa*, *Sporotrichum Schenkii*, and *Candida albicans*.^{3,4,23}

The method of testing for fungistatic activity was as follows: Sabouraud agar plate surfaces were inoculated with a culture of the test organism. A sterile, cotton-tipped swab was dipped into a broth culture of the test fungus, and then used to inoculate the surface of an agar plate. This procedure was repeated, using the same swab, as each of the test plates was inoculated with a specific fungus. Discs of filter paper, impregnated with various concentrations of a test compound, were then placed on these inoculated plates. Solutions of each compound were prepared in the following concentrations: 0.10, 0.05, 0.025, 0.01, 0.005, 0.0025, 0.0010, and 0.0005 molar concentrations. Discs in sufficient number for each dilution of each compound were prepared, so that the effects could be determined on all fungus test organisms.

When the inoculations were completed, the test discs were placed immediately on the surface of agar plates. Two discs impregnated with varying concentrations of the compound to be tested were placed in such a way that any zone of inhibition could be easily noted and measured. At least four plates were required to determine the effects of a single compound on one of the test organisms. The results were recorded after six days of incubation at 32° C. for all the fungi except *C. albicans*, which was examined at the end of 24 hours.

The zones of inhibition surrounding the discs containing the compounds were of two types. When no fungus growth was visible in the area around a disc, the zone was considered one of *complete* inhibition. *Partial*

inhibition was the term used to define a zone where minimal growth of the fungus occurred in the area around a disc. At the end of the incubation period, the zones of inhibition on the plates were measured and the diameter and type around each concentration of the compounds were recorded.

The high incidence of infection with *Coccidioides immitis* among Armed Forces personnel in certain geographic areas is a serious problem to the military physician. It has been deemed essential to screen potential agents, in order to extend the list of potential antagonists against this fungus. The method described above has been used for the rapid selection of agents to be employed in studies of their toxicity and/or therapeutic effectiveness in experimental animals. By this procedure the most effective compounds can be chosen for clinical evaluation.

DISCUSSION

Outstanding contributions have been made by the science of microbiology to the overall progress of military medicine in lowering the non-effective rate. It is the microbiologist who accomplishes the definitive laboratory studies needed to determine the etiology of infectious processes. Preventive medicine programs are made more effective by the bacteriological control of water, food, air, and other environmental factors. In many situations the microbiologist works as a "Shoe leather epidemiologist." He is concerned with the detection and identification of pathogenic microorganisms. Microbiologists have discovered many of the antibiotics. They are valuable and useful members of the team in military medicine today.

It is clearly evident that infectious diseases are still extremely important medical causes of non-effectiveness within the military services. The causative agents of bacterial, fungal, and viral infections should be detected, isolated, identified, and reported as early as possible, along with reliable definitions of their susceptibility to the available chemotherapeutic agents, in order to aid the physician in treating the individual patient and

in controlling the spread of the disease.

There has been a tendency in the past to omit laboratory diagnoses of these diseases, on account of the extended time required for the tests. When they are omitted, there is a very real danger that a true etiological diagnosis also may be overlooked. The practical value of microbiology, i.e., the analysis, can be lost because service is too slow. Extensive studies have been made in the past to advance the science of bacteriology and its allied phases. Attention now must be given to techniques by which the microbiologist can render better service to the practical needs of the military physician.

Knowledge of the different microbiological analyses used to detect and identify the causative agents of selected diseases is necessary, so that the analytical procedures on which emphasis should be placed can be selected. With this knowledge we can determine the adequacy of the tests and the time they consume before definitive answers can be given to the physician. Specific time-consuming tests can then be selected for improvement. These principles have been exemplified in the development of simpler, faster, and more accurate methods to determine the susceptibility of pathogenic microorganisms to antibiotics and other chemotherapeutic agents, or to perform standard serological and biochemical tests. These improved methods should solve many pressing medical problems of the military physician.

SUMMARY

1. The importance of rapid microbiologic methodology, as a means to assist in reducing the non-effective rate due to infectious diseases in the military service, has been reviewed.

2. Methods which have been developed, modified, evaluated, and applied for the earlier detection, isolation, and identification of pathogenic organisms are discussed. These methods have evolved from studies of cultural and biochemical characteristics, serologic reactions, infrared absorption spectra, tissue culture methods, and procedures for

the collection of adequate specimens to be used in microbiologic analyses. A simple and rapid method to determine the antibiotic susceptibility of microorganisms also is described.

3. The application of rapid microbiologic methodology in military laboratories is discussed, in relation to medical problems encountered in enteric infections, streptococcal disease, otitis externa, tuberculosis, infections of the urinary tract, bacteremia and septicemia, mycotic infections, and viral infections.

4. Simplified techniques are provided for microbiologic analyses which will provide fast and reliable answers about the identity and antibiotic susceptibility of microorganisms.

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THE TEARS OF XERXES

Herodotus, in Book Seven of his History, tells of the march of Xerxes (485-465 B.C.) against Greece. The Persian king spent four years in assembling a huge army and a formidable fleet for the invasion of Greece. Then, he ordered the construction of pontoon bridges across the Dardanelles so that his troops could pass afoot from Asia to Europe. After such careful preparation he desired to survey his land army and his ships. Upon a hill, near the city of Abydos, a marble throne was constructed from where the king had an overall view of all his forces.

The Greek historian narrates that as Xerxes looked upon the shore below and the sea, and saw the whole Hellespont covered with the vessels of his fleet, and all the shore and every plain about Abydos as full as possible of men, he congratulated himself on his good fortune. But after a little while he wept.

When Artabanus, the king's uncle, saw this and commented upon the tears of Xerxes, the king answered: "There came upon me a sudden pity, when I thought of the shortness of man's life, and considered that of all this host, so numerous as it is, not one will be alive when a hundred years are gone by."

To which Artabanus replied that in everyone's life there is a moment where he wishes to be dead rather than alive: "... So death, through the wretchedness of our life, is a most sweet refuge to our race." Xerxes' tears were not in vain; his fleet was later destroyed at Salamis (480 B.C.), and his army collapsed at Marathon and Plataea (479 B.C.). (EDITOR'S

NOTE: *Corrigendum to the motto on p. 445 of our December 1954 issue.*)

Unsolved Problems in Microbiology*

By

VICTOR H. HAAS, M.D.†

THE SCIENCE OF MICROBIOLOGY

MICROBIOLOGY is the study of microorganisms. Medical interest in microbiology is directed toward those species which are related to human illness. In practical usage, medical microbiology has a much wider compass than strict interpretation of the term would indicate. It deals with many organisms which are by no means microscopic (e.g. parasitic worms, insects, snails, rodents), including host animals (one of which is man) as well as parasites. It involves scores of disciplines, ranging from bacteriology to clinical medicine, and including biochemistry, physiology, entomology, parasitology, epidemiology, and many sub-divisions of these, and likewise other major specialties.

There are two facets to microbiology. One is the concept of a broad segment of scientific endeavor, comparable to astronomy, paleontology, geology, and so on. In this sense, microbiology has attained the status of an independent science, with its own goals, techniques, and rewards. From another point of view, microbiology is the source of many of the scientific weapons with which we have attacked the infectious and parasitic diseases of man. In the latter sense, the stature of microbiology is attested by the tremendous progress achieved in this broad area of medicine and public health.

The unsolved problems in microbiology may be viewed with both these concepts in mind. If such a view is to be constructive, it should enable us to assess the possibilities for progress in several directions. The primary task is to consider what contributions

microbiology—either as an independent science or as a major branch of medical science—can make to the solution of some of the outstanding medical and public health problems.

MICROBIOLOGY AND CANCER

One urgent problem is cancer. The American public and American scientists are assiduously seeking an answer to it. In 1952 voluntary contributions to the American Cancer Society were almost 16½ million dollars;¹ for the current fiscal year the Congress appropriated nearly 22 million dollars for research and related work in this field.² In a recent popular review of medical problems, a prominent writer has devoted four chapters to cancer in a twenty-chapter book.³ These figures indicate the magnitude of public and private interest in the cancer problem.

What are the possibilities for contributions by microbiologists to our understanding and ultimate conquest of cancer? Part of the answer is that since cancer is a matter of abnormal cell behavior, cytologists, cell physiologists, microbial geneticists and others interested in what goes on in the cell are in a favorable position to advance our knowledge of cancer. The scientists who have studied cellular changes in microorganisms—ranging from viruses to pathogenic protozoa—are intellectually equipped to apply their experience to the cancer cell. The fundamentals of cellular abnormalities need not be studied exclusively in the vertebrate; noteworthy contributions in this area already have come from protozoology.⁴

There is a growing willingness to look at cancer and viruses together. A few years ago, an eminent English virologist, C. H. Andrewes, said:

“ . . . I gather that in many quarters in this country it is considered not quite nice

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to mention viruses and cancer in the same breath. Indeed, I was rather expecting that I should be required to abjure not only communism and polygamy but also the virus theory of cancer before being allowed to land in this country.⁷⁵

A change in this attitude is attested in a recent statement by an outstanding investigator in virology, André Lwoff:

"Let us recall that the inducing agents which can trigger proviruses to give rise to viruses are all not only mutagenic but also carcinogenic—radiations, nitrogen mustard, and so on. It is indeed tempting to theorize that carcinogens may induce malignancy by initiating the formation of a pathological structure from a provirus-like material. Many facts are in favor of the hypothesis that proviruses originate some animal diseases, . . . suffice it to say that this is, at any rate, a working hypothesis."⁷⁶

The virus causation of some tumors has been known for more than forty years.⁷ New techniques provide the virologist with opportunities to explore fields heretofore closed to him.⁸ One of the most intriguing of these new areas is the relationship of viruses and tumors.

Another segment of microbiology which is of growing interest to the student of neoplastic disease is that of interference—or antagonism—among microorganisms. This phenomenon, widespread among viruses,⁹ has been shown to occur between certain microorganisms and some forms of cancer.¹⁰ In some instances, actual destruction of cancer cells occurs under experimental conditions.

Without speculating as to where such leads may take us, it is logical to urge that microbiologists give serious attention to these suggestive developments. The people who support research want the cancer problem solved. All scientists whose knowledge and skill might contribute to the solution will find many opportunities to apply their initiative.

THE CHRONIC DISEASES

There is a rapidly growing public in-

terest in chronic diseases generally. People want to enjoy the years which have been added to their lives by the conquest of the infectious and parasitic diseases. The magnitude of interest in several large groups of chronic diseases is indicated by the voluntary contributions (1952) to appropriate agencies:¹

American Heart Association6½ million
United Cerebral Palsy Activities4½ million
Arthritis and Rheumatism Foundation	.1½ million
Others in chronic disease fields2½ million

Current fiscal year appropriations by the Congress are another indication of interest:²

Heart disease16.6 million
Mental illness14.1 million
Neurological diseases and blindness	.. 7.6 million
Arthritis and metabolic diseases 8.2 million

In the popular review previously referred to, ten chapters were devoted to the diseases in this broad field.³ It is not hard to see where public interest lies or to deduce what the people want done in medical and public health science.

A fundamental question in many of these chronic, disabling diseases is causation. Infections are implicated in some manner—sometimes obvious and sometimes obscure—in many disorders of the heart, blood vessels, and kidneys.^{11,12} Some of the neurological diseases have features suggestive of host reaction to infection. Many cases of blindness are related to infection; recently the collaboration of members of the Armed Forces Institute of Pathology and the National Institutes of Health has proved *Toxoplasma* to be responsible for a number of eye disorders.¹³

Some of the illnesses in this large and heterogeneous group are possibly related to antigen-antibody reactions as yet poorly understood.¹⁴ Congenital anomalies may be the result of infection of the mother during pregnancy, known to occur in German measles¹⁵ and toxoplasmosis.¹⁶

The methods of epidemiology are being applied to chronic illnesses. This approach led to the solution of many problems in infectious and parasitic diseases in the past.

It has been said recently: "The new epidemiology should not be restricted to epidemics and infectious disease, but should be applied to combat such afflictions as cancer, mental illness and accidents . . . (it) should be regarded as the diagnostic discipline of public health and not as a body of knowledge too frequently restricted to epidemics and communicable disease . . . it is a stupendous fallacy to assume that the control, prevention, and cure of infectious disease consist merely in the eradication of the causative organisms. . . ."¹⁷ There is theoretical justification for applying the principles of epidemiology to the unsolved problems of chronic diseases.

These are some of the areas in which the microbiologist can claim a legitimate interest in the chronic diseases. The opportunities and the challenge await the application of his methods and his skills.

INFECTIOUS AND PARASITIC DISEASES

The public—whom science must serve and upon whose support it depends—are not exclusively preoccupied with diseases of older years. There is strong public sentiment for improving the health of our children.¹⁸ The largest of the voluntary contributions goes to the National Foundation for Infantile Paralysis—over 41 million in 1952. The next largest is made to the National Tuberculosis Association—more than 23 million in the same year.¹ Both these diseases are predominantly afflictions of children, adolescents, and young adults.

In these areas, and in numerous other infectious and parasitic diseases which have not been conquered, the microbiologist is at home. This is where he has made his great contributions in the past, and where he will go on making them. There are still plenty of unsolved problems in the infectious and parasitic diseases:

Etiology of such illnesses as the common cold and the epidemic diarrheas has not been established. Even clinical definition of many of the "respiratory infections" is not yet possible.

Diagnostic methods now available are—in the practical sense—sometimes no more helpful than

those current in the time of Koch, or even Sydenham, e.g., tuberculosis, measles.

Treatment is lacking, inadequate, or impractical for such diseases as the common cold, influenza, poliomyelitis, the virus encephalitides, many mycoses, tuberculosis, schistosomiasis, filariasis, and many more.

Immunization is far from satisfactory. Many vaccines are of questionable value (typhoid, cholera, plague). Some are likely not to be available when most needed (influenza).

Others, though potent if properly maintained, have scarcely been improved since their discovery (vaccinia).

These examples are indicative of typical problems remaining in the field which was the original province of the microbiologist. There are many more which are beyond the scope of a limited discussion.

FUNDAMENTAL MICROBIOLOGY

The microbiologist, like any other scientist, is aware that one of the functions of science, as Trytten has said, "is the timeless quest for more understanding of the nature of our world and the universe—the urge to expand the frontiers of knowledge regardless of whether the new information to be won is immediately useful or not. This has always been the primary meaning of the scientist's calling. . . ."¹⁹ According to Bronk, "Most scientists have a deep conviction that the discovery of natural knowledge, no matter how remote from human affairs it may seem, has an ultimate social value. They know that each of the achievements of our material civilization reaches back beyond technology, through a long sequence of discoveries which had in their time no obviously practical significance."²⁰

Microbiology is on the threshold of exciting adventures into the unknown. Warner has pointed out that there are many "instances of feverish activity along boundary lines. Physicists, chemists, and biologists are all concentrating on the filterable viruses, apparently disregarding the unimportant matter of which division of science is technically responsible for the filterable little beasts—or are they things?"²¹

Recent advances in studies with bacterial

viruses—or phages—have led to extensive interest in what is known as lysogeny, defined by Lwoff as “the hereditary power to produce bacteriophage.” This subject has been said to occupy “a privileged position at the crossroads of normal and pathological heredity, of genes, and of viruses.”²²

As might be expected, students of genetics are very active in microbiology. They can isolate single organisms from which to derive innumerable generations of descendents. They can obtain many generations in a few days. They can control the environment in order to obtain a whole variety of mutants. The techniques of microbiology provide almost ideal working conditions for attacking the problems of genetics.²³

The metabolic pathways and the activities of innumerable enzymes are under intensive study in bacteriology as well as protozoology. Von Brand notes that “Physiological aspects [of parasitology] have been developed essentially since the beginning of this century, but this development has gathered increasing momentum during the last 10 or 15 years.”²⁴ Similarly, according to Adelberg, “In the field of cellular metabolism, problems dealing with mechanisms of biosynthesis have been receiving an increasing share of attention in recent years. A major factor has been the growing understanding of the nature of energy relationships between catabolic and anabolic processes. . . . Another broad aspect . . . is the question of biosynthetic pathways.”²⁵ Kaplan and Melnick tell us that “probably the central problem of virus research today is the elucidation of the mechanism of virus synthesis.”²⁶

The rapidly growing knowledge of what goes on in the microorganism has made possible a new point of view in experimental chemotherapy where “there are indications that a second approach, based on physiological research, will become a rival of empirical chemotherapy.”²⁴

But the unsolved problems in fundamental microbiology are not limited to those directly related to the microorganism. Schwartzman advises that “it may be well to recall the

periodical shifts in interest which succeeded one another during the past 50 years in the sciences dealing with infection and resistance. It was only natural for investigators to be impressed by discoveries of specific causes of diseases and specific reactions of the body to these diseases. This was an era best defined as the era of “specificity.” Thus, the main emphasis was laid upon the invading agent, its behavior and characteristics, and the response of the body to the invader expressing itself in specific antibodies. As fruitful as this trend was, impasses began to appear. Consequently, many departures from previous thinking resulted from a large body of evidence concerned with variations in predisposition and resistance to disease which could not be explained on the basis of specific immunity, namely: refractoriness of certain animal species to highly infectious agents; variations in susceptibility to disease within the same animal species which could not be accounted for by the presence or absence of antibodies; variations contingent upon genetic selections, seasonal variations, selective affinities for various tissues and organs, and so forth.

“When considered together, these facts indicate the existence of important factors unrelated to specific immunity which may determine the predisposition or resistance of the host.”²⁷

These are only a few of the many unsolved problems in fundamental microbiology.

SUPPORT FOR RESEARCH IN MICROBIOLOGY

Scientists who have administrative responsibilities are increasingly aware that “the prosecution of scientific research depends more and more on public funds for support, and less on private benefactions.”²⁸ The public are disposed to support research in those areas where they have an interest. Such interest may be inherent, or it may result from purposeful stimulation.

There is not presently an acute awareness of needs for research in microbiology and

in many of the infectious and parasitic diseases, either by the public or by most physicians. People often don't know what they want—in science as well as in politics. They do not understand what science really might be able to offer them. They often accept or even acclaim something of an inferior quality, believing it to be the best obtainable.

If microbiology is to advance, if the unsolved problems are to be attacked vigorously and profitably, those who are aware of the potential contributions still to be made must see that public interest and support are generated.

If this is a valid goal, then the scientist must accept the principle that "laymen and amateurs still have important contributions to make to science. Indeed it may be questioned whether there can be any really wide understanding of what science is and how it works, save insofar as members of the community participate in some scientific activity at least in an amateur capacity. . . . Science is not a magic circle . . . science and technology are not magic or mysterious activities apart from the ordinary activities of men and women, and beyond their comprehension. In the modern world such an impression is highly dangerous to the continuation of science."²⁸

Bronk points out that "scientists are needed who can interpret their discoveries according to the best traditions of literature, can synthesize and integrate a vast mass of data. More scientists are needed who can formulate clear concepts . . . literature can assimilate the meanings that science merely formulates, restate them in terms of feeling and sentiment, fuse them with older and deeper meanings, and humanize them. . . .

"Let us, therefore, recognize the obligations we are under. Ours is the duty and the privilege of bringing home to every man the wonders, the significance, and the underlying harmony of the world in which we live. . . ."²⁹

The accomplishments of research in microbiology have dispelled the fears which public and physicians alike once had for the

great epidemics and the infectious diseases. Few Americans now living can comprehend the terror which yellow fever and cholera once engendered in so many of our citizens. Even the more recent pandemics of plague, von Economo's encephalitis, and influenza are largely forgotten.²⁹ Malaria, formerly the scourge of a great part of the South, is virtually gone from the continental United States. Where there once was helplessness, fear, and ignorance, most people now feel that—in the words in which the legendary Vagabond King defied the Duke of Burgundy besieging Paris—"We lie snug and warm behind our walls." Perhaps we do. But many thoughtful scientists realize that our apparent victories over the microorganisms are in reality only a truce. In some instances the cease-fire line has given the enemy far more territory than he ought to have.

To improve our position and to advance our knowledge—both in terms of fundamental new concepts and in respect to more effective application—we must stimulate more interest and support, and more sense of participation on the part of the public. There can be no research in the modern sense without large and continuous financial backing, and this now must come principally from public sources.

PROBLEMS OF THE SCIENTIST AS AN INDIVIDUAL

It has been said that "the most important and complex instrument employed in research is man himself."³⁰ Many like to think of the laboratory as an ivory tower, peopled with "young and enthusiastic research workers, full of high-energy phosphate bonds."³¹ Even scientists themselves may take an idyllic view of their calling; one (Hammett) has said:

"The true scientist is only concerned with following his vocation to the best of his ability within the limits of his capabilities. He is not properly concerned with hours of work, wages, fame, or fortune. For him an adequate salary is one that provides decent living without frills or furbelows. No true

scientist wants more, for possessions distract him from doing his beloved work."³²

But not all would agree. Another scientist (Kahn) puts it this way:

"Who can set the scientist apart from his neighbor by stating that he cares little about the conditions under which he lives. . . . The professional scientist is not different from others in needing a satisfactory standard of living, in desiring rewards commensurate with his training and productivity, and in wanting to play a part in his own future and that of his family, if a 'true' scientist is allowed one. Any scientist, as any other mature person who works for a living, is very properly concerned with 'wages, fame, or fortune,' since they help shape the society in which he lives."³³

The microbiologist, perhaps more than many other medical scientists, needs to think about problems of this sort. Unless adequate public support can be maintained, it is possible that some areas of microbiologic research will shrink. Attractive careers for specialists in such areas may be hard to assure. Devoted and competent scientists may find few opportunities to apply their initiative and their skills in a gainful manner. In microbiology particularly, the young scientist needs to look at his opportunities realistically.

The scientists' problems are not all or even mainly economic. Research is changing, and problems of organization and interpersonal relationships constantly assume greater importance. This complexity has been imposed to a major degree by science and scientists, to a lesser extent by society. The growth of specialization, and development of intricate and expensive instrumentation require a great deal of team research.³⁴ The scientist is by nature inclined to be an independent thinker, an individualist, and sometimes extremely hard to get along with. How to organize and maintain effective teams made up of essentially independent members is one of the problems of modern science generally, and microbiology is no exception.

CONCLUSION

There are many unsolved problems in microbiology. This review has stressed:

1. Contributions which microbiologists can make to the solution of problems in cancer and the chronic diseases.
2. The magnitude and nature of some of the problems still remaining in the infectious and parasitic diseases.
3. The opportunities for significant advances in fundamental microbiology.
4. The need for public support of research in microbiology and the obligations of the scientist to take an active role in obtaining support.
5. Problems of an economic and a scientific nature imposed upon the individual scientist by changing aspects of modern research.

The problems discussed are only a few of many that exist. Microbiology has contributed enormously to our present state of medical and public health achievement. Opportunities abound for even greater contributions. Some of the problems presented suggest such opportunities; others tend to emphasize the difficulties.

Fortunately, the assignment which was met by the preparation of this review did not require that answers to the problems be supplied. None are.

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A special course of dental lectures will be held in the Conference Room, Central Dental Laboratory, Walter Reed Army Medical Center on the following dates in February: 7th (4:00 P.M.); 14th (3:00 and 4:00 P.M.); 21st (2:00 P.M.); 28th (2:00 P.M.). An invitation is extended to all interested persons to attend these lectures.

Massive Upper Gastrointestinal Hemorrhage: Role of Emergency Surgery in Management

By

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IN THE five year period, January 1949 through December 1953, twenty-three patients have been subjected to emergency surgery for the arrest of hemorrhage from the upper gastrointestinal tract at Brooke Army Hospital. In the whole series of twenty-three, Table 1 shows the distribution and mortality. Twenty-two were male, all were white. The oldest was 74 and the youngest 17. The average age was 49.6 years. Six of the fatal cases were patients over 55 and five were 60 or over. Twenty patients had subtotal gastrectomy. Table 2 shows a breakdown by duration of bleeding prior to surgery. Table 3 shows the operative procedure done. Table 4 shows miscellaneous laboratory data, and Table 5 gives a graphic case summary.

Eight different surgeons performed the surgery in these cases and for eight patients the surgeon was a resident (two of the deaths). One resident did three cases, one resident two cases, and the other three residents, one case each.

Statistics gathered by Porter⁹ indicate that between 85 and 90 percent of patients with massive upper gastrointestinal hemorrhage are bleeding from lesions amenable to surgery. Most of these will be either gastric or

TABLE 1

Site of Bleeding	No. Cases	Surgical Deaths	% Mortality
Duodenal ulcer	14	4	28.4
Gastric ulcer	4	1	25.0
Stomal ulcer	1	0	0.0
Lymphosarcoma of duodenum	1	0	0.0
Not found	3	1	33.3
	23	6	26.0

duodenal ulcers and thus subject to benefit by subtotal gastric resection. Subtotal gastric resection is considered the operation of choice for the arrest of hemorrhage from

TABLE 2

	No. Cases	Surgical Deaths	Surgical Mortality
Under 48 hours	11	2	18.1
Over 48 hours	10	4	40.0

TABLE 3
(23 Operations)

Duodenal ulcer	14
Gastric ulcer	4
Stomal ulcer	1
Lymphosarcoma of duodenum	1
Not found	3
Subtotal gastrectomy	14
Subtotal gastrectomy	3
Ligation bleeding vessel	1
Subtotal gastrectomy	1
Subtotal gastrectomy with duodenectomy and pancreatectomy	1
Exploration	3

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TABLE 4

Case	Duration Present Hemorrhage	Hb	Lowest RBC	Hct	X-Ray	Endo	Death	Amount of Blood Given
1	Re-bled	9.0	3.2		Neg	Neg		3,500 cc.
2	Re-bled 3×1 wk	5.5		16	Pos		X	8,600 cc.
3							X	7,500 cc.
4	Cont. to bleed 2 days	6.0	2.0	19	not done	not done		
5	Bled 4 days unchecked	6.0		17				4,000 cc. plus 2,500
6	Re-bled 2 days	10.0	3.3		Prev.		X	22,650 cc.
7	Re-bled 6th day	6.5	2.6				X	4,500 cc.
8	Re-bled 3d day	7			Pos			12,000 cc.
9	7 days total Cont. bleed 2 days	5.5						5,750 cc.
10	Re-bled 5 days	12.5			Pos			2,000 cc.
11	Postop 9 days Cont. bleed 30 days				Neg	Neg	X	24,740 cc.
12	Cont. bleed 2 days							3,500 cc. plus 2,000
13	Cont. bleed 4 days	7.5			Pos	Unsuc.	X	7,500 cc.
14	Cont. bleed 2 days						X	
15	Cont. bleed 5 days	11.3			Pos	Pos	X	8,500 cc. plus 5,000
16	Cont. bleed 4 days	4.4	2.0		Pos			
17	Re-bled 2d day	11.9						
18	Re-bled 2×6th day	6.4		21	Pos	Pos		7,500 cc.
19	Re-bled 7th day	6.9		22 (Post-bulbat)	Pos			6,000 cc.
20	Cont. bleed 2d day	5.5			Pos	Pos	X	
21	Cont. 2 days	6.0		17				
22	Cont. 2 days	6.0					X	7,500 cc.
23	Re-bled Cont. 23 days				Pos			

bleeding peptic ulcer by most recent authors.^{1, 4-6, 9, 12}

The age of the patient has been given much consideration by some authors. In general, the young patient will tolerate more blood loss, is more likely to stop bleeding on medical management, and will have fewer surgical complications. The age should have no strong influence on the decision to operate.

The presence of other major disease should be no deterrent to surgery that is otherwise indicated. There were five patients in this series who had been hospitalized for another disease and developed massive gastrointestinal hemorrhage as a complication. Two of these patients survived. Another patient with stomal ulcer developed a cardiac arrest during induction of anesthesia for elective surgery to relieve obstruction. When

TABLE 5

Case	Age & Sex	Postop. Diagnosis	Past Hist.	No. of Prior Hemor.	Type of Bleeding this Epis.	Duration	Prior Surgery	Present Surgery	Complications	Additional Surgery	Results
1	41M	Unknown	4 mo.	2	Melena	4 da.	Expl. lap. 17 Jun 49	Expl. lap. 29 Mar 50 site not found	None	Subt. gast. 23 Oct 50 elsewhere	3-4 epis. bleeding since
2	72M	Duod. ulcer	20 yrs.	1	Melena & hemat.	8 da.	Gastrojejunostomy 1937	Subtotal	Massive pulm. embolism	—	Died 8 hr.
3	64M	Duod. ulcer	None	0		2 da.	—	Subtotal	—	—	Coronary death 3 mo.
4	46F	Duod. ulcer	None	0	Melena & hemat.	2 da.	—	Subtotal	—	—	Well 14 Jun 51
5	49M	Unknown	16 yrs.	3	Melena	6 da.	—	Subtotal	Toxic psychosis due to demerol	—	Well 15 Apr 54
6	29M	Ulcer of tumor	5 mo.	0	Melena & hemat.	16 da.	—	Subtotal & cholecystoduod.	Biliary obst. Subhepatic abscess	24 Apr. Common to GB. L&D 11 Apr	Died of tumor 24 Aug 51
7	62M	Duod. ulcer	20 yrs.	1	Melena & hemat.	6 da.	—	Subtotal	—	—	Card. d. 9 mo.
8	44M	Duod. ulcer	2 yrs.	0	Coffee-ground & melena	2 da.	—	Subtotal	—	—	Well 22 Apr 52
9	55M	Gast. ulcer	2 yrs.	0	Melena & hemat.	5 da.	—	Ligation vessel in ulcer	Relapse Vivax malaria	—	Well 15 Apr 54
10	50M	Gast. ulcer	3 mo.	0	Melena & hemat.	6 da.	—	Subtotal	—	—	Well 4 Feb 52
11	74M	Unknown	None	0	Melena	5 da.	Left pylolithotomy 10 Jan 52	Expl. lap. & cholecystotomy 19 Jan 52	Recurrent massive bleeding	Subtotal 8 Mar, 7th day bleeding	Died postop.
12	45M	Duod. ulcer	14 yrs.	2	Melena	2 da.	—	Subtotal	—	—	Well 11 Apr 54
13	58M	Gast. ulcer	None	0	Melena & hemat.	4 da.	—	Subtotal	Evisceration anuria	Clos. evisceration 28 Mar	Died 10 Apr
14	73M	Gast. ulcer	None	0	Melena & hemat.	4 da.	L. nephrectomy 2 Sep 52	Subtotal 14 Sept	—	—	Died 29 Dec
15	57M	Duod. ulcer	2 yrs.	1	Melena	2 da.	—	Subtotal 28 Mar 53	—	—	Died 2 Apr 53
16	36M	Duod. ulcer	15 mo.	1	Melena	4 da.	—	Subtotal	—	—	Well 1 Oct 53
17	29M	Duod. ulcer	4 yrs.	1	Melena	30 h.	—	Subtotal	Lap. pack left, 14 Sep 53	Pack removed 19 Oct 53	Well 15 Apr 54
18	32M	Duod. ulcer	4 mo.	0	Melena	2 da.	—	Subtotal	—	—	Well 15 Apr 54
19	30M	Duod. ulcer	9 yrs.	2	Melena & hemat.	8 da.	—	Subtotal	—	—	Well 15 Apr 54
20	60M	Mult duod. ulcers	5 yrs.	0	Melena	5 da.	—	Subtotal 26 Nov	Duod. fistula	Jejunostomy 26 Dec	Died 27 Dec
21	32M	Duod. ulcer	5 yrs.	0	Melena & hemat.	3 da.	—	Subtotal	Mismatched blood	—	Well 15 Apr 54
22	17M	Duod. ulcer	None	0	Melena & hemat.	24 h.	Cutaneous ureterost.	Subtotal	—	—	Died
23	61M	Marg. ulcer	20 yrs.	0	Melena & hemat.	30 h.	Gastroent. 1923. Card. massage 27 Nov	Subtotal	—	—	Well 15 Apr 54

massive continuing hemorrhage developed several weeks later, he withstood subtotal gastrectomy without difficulty. When the surgical arrest of hemorrhage has appeared necessary to prevent exsanguination, it has not been withheld because of associated disease.

Mortality statistics vary markedly because of the different methods of selection of each major series reported. It is a well accepted fact that morbidity and mortality rates are higher for these patients and that the rate climbs rapidly in patients who have been allowed to bleed more than 48 hours. Elective resection is most desirable, resection in the presence of bleeding in an undepleted patient is second, and any surgery in a bleeding, depleted patient is a poor third. It must be remembered, however, that a patient who is a poor surgical risk is also a poor risk for medical conservative management.

Two outstanding weaknesses have been observed in our treatment of these patients with massive gastrointestinal hemorrhage and it seems probable that others have a similar difficulty. Bleeding has a tendency to remain ahead of replacement, especially in those patients who bleed for more than 24 hours. Surgery tends to be delayed in the very patients who can least afford it—the older patient with other serious disease. Too little (with blood replacement) and too late (with surgery) expresses the entire dilemma.

Follow-up has been obtained in sixteen of the eighteen surviving patients. Four patients have died, two of heart disease, one of lymphosarcoma, and one of bronchiogenic carcinoma. One patient with esophageal varices has had further bleeding and further surgery with continued survival. The remaining eleven patients were contacted in April of 1954. Case No. 1 is the only one with recurrent bleeding. Three complain of failure to gain weight, and one may have a marginal ulcer.

Histories of all our fatal cases plus case histories in two surviving patients where no bleeding point was found are presented briefly, with the belief that we learn most from our complicated and fatal cases.

CASE REPORTS

Case 1: a 41 year old white man entered Brooke Army Hospital 2 February 1949 with the complaints of hematuria, difficulty initiating urination, and costovertebral angle pain. Transurethral resection of a bladder neck obstruction was performed and the patient was discharged on 18 March. On 5 April he was admitted to another service hospital complaining of weakness and 20-pound weight loss. Marked anemia was found and the stools were positive for occult blood. The patient was returned to our hospital and during the next two months extensive study failed to indicate a possible bleeding point, although the stools continued to contain blood. In all, four upper gastrointestinal X-ray studies, three barium enemas, intravenous and retrograde pyelograms, gastroscopy, sigmoidoscopy and a large battery of laboratory tests were essentially normal. Elective exploration on 17 June 1949 also failed to demonstrate a lesion. Following operation, the bleeding stopped and the patient was returned to duty. In September, at another hospital, he was treated for massive hemorrhage without surgery. In late October and again in December 1949 he was admitted to another hospital and treated by transfusion for massive hemorrhage. On the latter occasion, esophagoscopy showed no evidence of bleeding varices. He was readmitted to this hospital on 27 March 1950, having passed tarry stools for two days. Bleeding continued, blood transfusions were given, and a laparotomy was performed. Again the site of bleeding was not found. The patient has not been seen here again but reports from other hospitals have enabled us to complete the follow-up. After leaving this hospital in June, again in remission, the patient was well until October when bleeding recurred. Exploration at another hospital did not reveal the source of bleeding but an empirical subtotal gastrectomy was performed. The patient did well until February 1951 when bleeding again occurred. Complete diagnostic evaluation at Walter Reed Army Hospital failed to demonstrate a lesion, the patient stopped bleeding and was

discharged. In a letter from the patient in April 1954, he states that he still bleeds intermittently. He is now out of the service.

Case 5: a 49 year old white man with a 16 year history of duodenal ulcer, was admitted to the hospital 27 February 1951. The morning of admission he had passed two tarry stools, the second containing some bright blood, and had felt extremely weak. Hematemesis did not occur but melena continued. The hemoglobin was 11 grams on admission and despite several transfusions (inadequate) declined to 6 grams on 3 March. After transfusion with 3000 cc. of whole blood, a subtotal gastrectomy was performed. Marked scarring was present in the first portion of the duodenum. Duodenotomy was not performed. The postoperative course was complicated by a toxic psychosis, attributed to demerol. Total blood replacement was 7000 cc. but the initial delay might have been fatal. Further bleeding had not occurred at the time of the last follow-up in April 1954.

Case 11: a 74 year old white man, was admitted to the Urological Service on 2 January 1952 for consideration for surgical treatment for a calculus of the left kidney. On 10 January, a left pyelolithotomy, ureteroplasty and decapsulation were performed. The patient did well until the fourth postoperative day when he suddenly went into shock. After a 500 ml. whole blood transfusion, the pulse and blood pressure were back to pre-shock levels and the cause of the episode was not determined. On the sixth postoperative day, shock again developed; during the next twelve hours intravenous neosynephrine and 4000 ml. of whole blood were used to maintain the blood pressure which then stabilized again. On the eighth postoperative day the patient had massive hematemesis and several tarry stools. After the administration of 1500 ml. of whole blood, exploratory laparotomy was performed. A gangrenous gallbladder was found but the site of bleeding was not demonstrated. A cholecystostomy was established. The postoperative course was stormy for the first ten days with continued melena. Then the patient's condition seemed to stab-

ilize, the stools became normal in color, and the cholecystostomy tube was clamped with no untoward effect. A cholangiogram and an upper gastrointestinal X-ray study were within normal limits. The patient was returned to the Urological Service for further care, but on the third day there he began to vomit again. Some streaks of blood were noted but there was no evidence of marked hemorrhage until 25 February. During the next three days severe bleeding recurred necessitating the use of multiple transfusions. On 1 March he was returned to the Surgical Service where he seemed to stop bleeding after several additional transfusions. On 8 March, massive bleeding recurred; a surgical exploration of the abdomen was again made, including a wide gastrotomy and duodenotomy. The site of hemorrhage was not discovered. An empiric subtotal gastrectomy was performed. Postoperatively, the patient developed severe shock and died on the eighth postoperative day. Autopsy demonstrated a small carcinoma in the main pancreatic duct with ulceration of a moderate-sized artery. A total of 24,750 ml. of blood had been given.

Case 2: a 72 year old man with a 20 year history of diverticulosis and a 12 year history of duodenal ulcer was admitted to this hospital on 20 September 1949 with the complaint of intermittent abdominal cramping and tarry stools of two weeks duration. A gastroenterostomy had been performed in 1937. Gastrointestinal X-ray studies with barium demonstrated an ulcer in the duodenum, a well functioning gastroenterostomy, and diverticulosis of the colon. The patient's course was uneventful until 30 September when the patient collapsed while walking to the toilet. Pulse was rapid, blood pressure was unchanged. The next morning hemoglobin determination showed a fall of 4 grams; a 500 ml. blood transfusion was given. The pulse remained rapid and the blood pressure remained unchanged for the next three days. On the morning of 2 October the hemoglobin was 5.5 grams. During the next 24 hours, 3000 ml. of whole blood was given, the hemoglobin rose to 10 grams,

and there was considerable improvement in the clinical condition of the patient. A small amount of bleeding occurred again on 6 October, and on 7 October massive hematemesis with melena occurred. Shock was controlled by rapid transfusion; emergency surgical exploration was performed. An actively bleeding duodenal ulcer was found. A sleeve resection of the ulcer was performed, leaving the gastroenterostomy in place. The patient died suddenly eight hours after surgery of massive pulmonary embolism.

Case 13: A 58 year old white male, was admitted to the Medical Service of Brooke Army Hospital on 1 March 1952 because of hypochloremia apparently due to vigorous use of mercurial diuretics. He had been in good health except for asthma until 1945 when, after the development of dizziness, headache and diplopia, he was found to have severe hypertension with a systolic pressure of 280. He improved with a five-week period of bed rest and weight reduction from 240 to 187 pounds but had continued to feel poorly and he was unable to work. In August 1951, he developed lower extremity edema, and in September dizziness and weakness developed. He was hospitalized in January 1952, remaining until 20 February 1952. During this admission, multiple myeloma was discovered on sternal puncture performed for evaluation of anemia. Additional findings included an abnormal electrocardiogram suggesting an old anterior myocardial infarction, and PSP retention of 45% in two hours. His clinical condition gradually improved under treatment. After re-admission on 1 March, he was found to be fibrillating. Digitalis and quinidine were begun and aminophylline was continued. On 19 March, a course of urethane, 0.9 gm. four times daily, was started in an effort to destroy the myeloma cells. On 21 March, he was started on priscoline for cramping pain in the calves. During the night of 21 March, he vomited some coffee-ground material and the next morning some bright blood. Bleeding continued throughout that day and 2000 ml. of whole blood was given. X-ray exam-

ination suggested the presence of an ulcer on the greater curvature of the antrum of the stomach. On 23 May there seemed to be no further bleeding, but on the next day it began again. He was given a 1000 ml. blood transfusion on 24 March and on 25 March, after 800 ml. more blood, emergency exploration was performed using a vertical rectus-splitting incision. Two chronic indurated gastric ulcers, each approximately 2 cm. in diameter, were found, one on the lesser and one on the greater curvature of the antrum. Many smaller ulcerations, sharply defined, were present throughout the stomach. No evidence of multiple myeloma could be found on histologic study of the resected stomach. Subtotal gastric resection was carried out and an additional 2000 ml. of blood was given during the operative day. His postoperative condition remained good until the evening of the third postoperative day when he eviscerated. After resuture of the incision, oliguria and respiratory difficulty developed. Despite all efforts, his course was downhill until death occurred 10 April 1952. Autopsy findings included: arteriosclerotic heart disease, mural thrombi of the right auricular appendage, an anterior septal infarction, lung abscess in the left upper lobe, bronchopneumonia, plasma cell myeloma of bone marrow, chronic passive congestion of the liver, arteriolar and arterionephrosclerosis of the kidneys with some chemical nephrosis due to mercury, and a mild, generalized peritonitis. The anastomosis and duodenal stump were healed.

Case 15: A 57 year old white man with a history of bronchiectasis of five years duration and cirrhosis of three years duration was admitted to this hospital on 31 December 1952 with the complaints of increased cough and sputum production and increased abdominal distention during the previous month. On admission, the patient was acutely ill with productive cough, tremors, slight icteric tint, spider nevi and fever. His initial treatment was with terramycin for his infection and chloral hydrate for sedation. After one week, his condition was much improved

except for increasing ascites that required removal of 2800 ml. on 20 January and 4200 ml. on 11 February. On 4 March, 6250 ml. of fluid were removed from the abdomen and evidence of slow gastrointestinal bleeding developed. Esophagoscopy was performed, finding non-bleeding varices with pressure readings being 240 and 260 mm. of water. Cirrhosis therapy was continued. On 27 March, after five days of vague abdominal distress, patient went into shock. A Patton tube was inserted and transfusions given. With the esophageal balloon inflated, blood was obtained from the stomach for a time and then seemed to stop, and the blood pressure stabilized. The tube was removed and an emergency barium X-ray study demonstrated a duodenal ulcer. The next day the patient began bleeding again. With the Patton tube in place, bleeding continued and it was felt that the bleeding was from the ulcer. Emergency exploration was performed 28 March and a bleeding posterior duodenal ulcer was found. The liver was small and cirrhotic and there was ample evidence of portal hypertension. The ulcer was not removed but the bleeding was controlled by suture ligation and a subtotal gastrectomy performed. The patient expired without regaining consciousness on 2 April. Death was attributed to liver failure and prolonged tissue anoxia.

Case 22: A 60 year old white man with a five year history of indigestion somewhat relieved by milk of magnesia tablets but without association with food ingestion, was admitted to this hospital on 26 November 1953, complaining of five days of melena, weakness and three episodes of unconsciousness. Blood pressure was 105/55, pulse 104, hemoglobin 5.5 grams, and RBC 2,490,000. Barium X-ray study demonstrated deformity suggesting ulceration of the second portion of the duodenum and a duodenal diverticulum. Multiple transfusions were given and bleeding continued. Twelve hours after admission, emergency exploration was performed. Two separate ulcers were found to be bleeding, one in the first portion of duo-

denum and one in the second portion near the ampulla. Both were oversewn. The wide duodenotomy was closed with removal of the diverticulum, and a subtotal gastrectomy performed. Because of the proximity of the common bile duct to one ulcer, a T-tube was left in the common duct and the duodenal stump was left with a catheter in place for drainage. Postoperative management was extremely difficult due to this duodenal drainage. Dehydration and electrolyte imbalance were never completely controlled. About one week after surgery, a transient jaundice developed and lasted about one week, being caused by displacement of the T-tube. After cholangiogram demonstrated patency of the common bile duct, the T-tube was removed with subsequent clearing of the jaundice. Attempts at oral intake were so unsuccessful that a tube jejunostomy for feeding purposes was performed on 26 December. On 27 December massive hemorrhage recurred, administration of multiple transfusions failed to maintain his blood pressure, and he died about 15 hours later. Autopsy failed to demonstrate the site of this final bleeding.

Case 24: A 17 year old white man with a long history of urinary difficulty, was admitted to the Urological Service on 17 October 1953. Bilateral pyelonephritis and hydronephrosis had been present and a left nephrectomy had been performed to remove an infarcted, non-functioning kidney earlier in 1953. On admission, the patient's disease was in a relatively inactive phase, but an exacerbation necessitated nephrostomy on 10 December. Frequent tarry stools were noted on 13 December. After several hours hematemesis began and the patient went into shock. Rapid transfusion of blood maintained his blood pressure satisfactorily but bleeding continued. After about thirty hours of bleeding, exploration was performed despite the rather hopeless outlook. A posterior wall duodenal ulcer penetrating into the head of the pancreas was found. The ulcer was not removed but bleeding appeared well controlled by suture ligation. Subtotal gastrectomy was performed. Postoperatively, the

patient was hypotensive and his pressure did not rise with apparently adequate transfusion. He passed several tarry stools on 16 December but it is not known whether this represented additional hemorrhage or blood which had remained in the intestine from his previous bleeding. He died on 16 December after a prolonged period of hypotension that responded neither to blood nor to vasopressor substances.

DISCUSSION

It will be noted that three of these patients had been bleeding more than forty-eight hours and that three patients had severe disease in another system and fit most of the criteria for stress ulcer.¹⁰ Finsterer was the first to point out the great increase in mortality in patients operated upon for hemorrhage after more than 48 hours of bleeding.

The management of a patient with massive upper gastrointestinal hemorrhage presents some of the most difficult problems in medicine. The opposing views of surgeon and internist have been largely reconciled in the past twenty years, but the medical literature continues to record divergent opinions of the optimal management of these cases. Three principal points appear to be at issue: (a) the extent to which lost blood should be replaced; (b) the timing and extent of diagnostic efforts; (c) the period of time and amount of hemorrhage which may be permitted before surgical intervention. Definition of what constitutes a "massive hemorrhage" is necessary if the results of different therapeutic programs are to be comparable, but there are some objections to accepting Stewart's criteria:¹² a hemoglobin of less than 7.5 grams or a red blood count of 2,500,000 or less. If an aggressive attempt at blood replacement is made, one may be able to maintain the circulating blood volume and red cell mass at much higher levels in the face of a bleeding lesion which would plummet these values far below the "critical level" if lesser amounts of blood were administered. "Shock" is also an unreliable crite-

rion, for severe blood loss may occur before symptoms and signs become evident. Lipp and Aaron have proposed a "transfusion test" to determine which patients will require operation. We have had no such rigid rules to guide us, but have selected for emergency surgery those patients in whom bleeding could not be stopped or who re-bled at any time while in the hospital. Rate of blood loss is as important as duration of hemorrhage. Careful history and physical examination, the necessary determinations of the blood count, hemoglobin and hematocrit and other indicated studies are quickly conducted. Roentgen-ray examination of the upper gastrointestinal tract is made promptly if it seems likely that the bleeding is from gastroduodenal ulceration. If there is a probability that esophageal varices or hiatus hernia is the bleeding source, esophagoscopy and gastroscopy precede the x-ray examination. We make a serious attempt to define the probable source of hemorrhage prior to surgery and have been successful except in the occasional case.

This aggressive attitude toward blood replacement, prompt diagnostic measures, early decision for or against surgery, has developed as the result of our experiences over the past five years. We feel that some benefit has accrued from a review of our experience, with emphasis upon the errors.

The management of each patient has reflected the lessons learned from the prior patients in the series and from the contemporary literature. Since the fatal cases usually represent the greatest difficulty in management, these cases have been presented in some detail. The present concept of treatment in this hospital is a formalization of the impressions of many observers and seems to restore order to a previously confused problem. The confusion in the literature has resulted from an attempt to select a group of patients for operative treatment. The necessity of careful evaluation and individual consideration of each patient must be emphasized.

Patients with acute, severe upper gastro-

intestinal hemorrhage seem to fall into three natural groups: (1) Those who continue to bleed rapidly; (2) Those who stop (or appear to stop) bleeding soon after admission and then bleed severely again; (3) Those who stop bleeding soon after admission and recover quickly. The patients that clearly belong in the first group or third group have seemed to present less difficulty in management than the second group.

Group 1, the patient who bleeds severely and continues to bleed: This patient is usually in shock when first seen. Initial efforts are directed toward restoration of his normal circulating blood volume and red cell mass. Dextran (or other plasma volume expander) may be used initially until blood can be cross-matched but completely adequate and rapid replacement of whole blood followed by maintenance at normal or near normal levels is of prime importance. A satisfactorily accurate working diagnosis based on history and physical examination usually is possible. In some instances esophagoscopy to rule out bleeding from esophageal varices has been considered necessary, and X-ray examination using contrast medium has been very helpful. These procedures have been used without hesitation because we feel that accurate diagnosis is essential for proper treatment. During this period of circulatory restoration and diagnosis, the patient is considered a candidate for surgical arrest of hemorrhage. The guiding principle is: Is it safe to defer surgery?

Group 2, those patients who stop (or appear to stop) bleeding soon after admission and then bleed again hours or days later. This is the group that presents the greatest difficulty of management. The typical patient in this group is one who comes to the hospital with a history of hematemesis or melena, or both earlier that day or the day or two before. Fainting may or may not have occurred, but there is usually a history of progressive weakness. Shock may or may not be present on admission; if present, it is rapidly relieved by a relatively small amount of blood. The patient's condition at this point

is deceptive because of the ability of the body to compensate for loss of blood. Thus, there is danger that replacement of blood may not be adequate, leaving the patient in a poorer condition to withstand subsequent hemorrhage. A second danger also presents itself—when bleeding has apparently ceased, there is some hesitation in using any diagnostic measure that may initiate further bleeding. There is no apparent means by which we may determine which patients will bleed again. Because the surgical mortality increases so rapidly in patients who have been bleeding continuously or intermittently for more than forty-eight hours, the feeling has grown among both internists and surgeons that immediate surgery is desirable for a patient who has a recurrence or exacerbation of hemorrhage severe enough to affect the circulating red cell mass while in the hospital under optimum therapy, and who has a lesion amenable to surgery. The literature^{2, 3, 7, 11} is full of reports of fatal cases in which two or more shock-producing hemorrhages occurred at intervals followed by a fatal third (or fourth or fifth) hemorrhage. It is a tragedy for a patient to die while on "conservative" management of a hemorrhage which could be controlled surgically.

Group 3, those patients who stop bleeding soon after admission: These are not considered candidates for emergency surgery though many will need subsequent elective surgery for optimum care. During the same five year period there were thirty-one patients with peptic ulcer who came to elective subtotal gastric resection following successful conservative management of a massive hemorrhage with one surgical death.

Exploration usually is undertaken with an established or presumed diagnosis of peptic ulcer. Through June of 1952 (13 cases) a vertical rectus-splitting incision was used exclusively. Since that time, a high transverse bilateral subcostal incision has been used. Although this small series of cases does not demonstrate any statistically significant difference in results, we have found that better exposure is obtained and fewer wound

complications have occurred in the second group. The site of bleeding frequently can be palpated. When no lesion is palpable, a wide gastrotomy including incision through the pylorus and duodenotomy sometimes is necessary to reveal the bleeding point. Once found, the bleeding is controlled with suture ligatures. In every instance we feel that subtotal gastrectomy should be performed if the bleeding has been from a peptic ulcer. The problem of resection of the ulcer base in a duodenal ulcer has not been given much attention; it was removed in six of our fourteen cases of duodenal ulcer. The very disquieting failure to find the site of bleeding occurred in three of our patients, two of whom have survived.

SUMMARY AND CONCLUSIONS

1. The management of a patient with massive upper gastrointestinal hemorrhage is the joint responsibility of internist and surgeon. Death of the patient must be considered failure for both.

2. Early, completely adequate blood replacement and careful maintenance cannot be over-emphasized. Failure to do so will severely prejudice the patient's chance for recovery.

3. There should be no hesitation in the vigorous effort to establish an accurate diagnosis whenever possible.

4. Some patients must have surgical arrest of hemorrhage.

5. The decision to operate must be made in each case on the basis of an individual evaluation of that patient and should be made at the earliest possible time. All peptic ulcer patients who have prolonged continuous bleeding or recurrent massive bleeding while in the hospital under optimum care should be explored.

6. The operation of choice in the presence of a peptic ulcer is subtotal gastrectomy.

7. In the past five years, our mortality rate for surgical treatment of massive upper gastrointestinal hemorrhage has been 26%. In this same period a total of 217 patients with peptic ulcer were subjected to partial gastrec-

tomy with an over-all mortality rate of 3.23%. Excluding the patients operated upon in the phase of acute hemorrhage, the elective gastrectomy group showed a mortality rate of only 0.46%.

8. In the acute hemorrhage group, the time factor is impressive as evidenced by our mortality figure of 18.1% for those operated upon under 48 hours as compared to 40% for those operated upon after 48 hours. Partly, this is explained by the fact that in some of the most serious cases there was reluctance to operate because of the desperate status of the patient.

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The Role of Entomology in the Preventive Medicine Program of the Armed Forces*

By

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MAN, plagued by insects since the dawn of time, has been slow in recognizing them as the deadly carriers of disease that they actually are. It has been less than 60 years since it was first recognized that insects were not only annoying pests but were actually responsible for transmitting disease organisms to man. Since that time, however, rapid progress has been made in detecting and understanding the relationships between diseases and their arthropod vectors. With that understanding, marked reductions in the incidence of arthropod-borne diseases throughout the world have been made possible.

Recognition of the role the entomologist could and should play in promoting the health and welfare of members of the Armed Forces is even more recent. However, long before the professional entomologist joined the ranks of the Armed Forces, officers of the Medical Corps and the Veterinary Corps were doing excellent entomological work. The entomological research of Reed and the insect control programs developed by Gorgas are known throughout the world. Many others made valuable contributions to our entomological knowledge. Kelser¹ was one of the pioneers in the study of insect transmission of encephalomyelitis; Holt and Russell covered the Philippines in a survey of malaria incidence and mosquito vectors; Reed, Vaughan, and Shakespeare²

reported on the typhoid epidemic in our troops in the Spanish-American War, and spot-lighted the fly as an agent in the transmission of infectious intestinal diseases among armies in the field.³ An Army Board⁴ studied plague in the Philippine Islands prior to the studies of the Indian Plague Commission, and, although its members did not detect the role of the flea in the transmission of the disease, they did keep plague out of the Army and the epidemic in Manila was brought under control.

Many interesting entomological observations were contributed by medical officers prior to the beginning of our understanding of the role of insects in disease transmission. Colonel Birmingham records the development of enormous swarms of mosquitoes at Ft. Buford in the 1880's in stagnant pools left as the spring floods receded, and states that during the mosquito season it was considered a breach of the proprieties to enter a house without first carefully brushing the mosquitoes off your clothing.⁵ Captain Macauley, writing of his experiences while stationed at Ft. Abraham Lincoln, Dakota in 1885, describes the enormous numbers of mosquitoes that made life miserable for both man and domestic animals. He states that "smudges" made by burning half dried grass in both officers' quarters and enlisted men's barracks were necessary to render the quarters inhabitable, and that heavy riding boots, thick trousers, leather gauntlets, and a thick "cache nez" tucked under the helmet and collar of the tunic had to be worn on the target range because of the mosquitoes. He attributed the alleviation of the mosquito nuisance in late July to the appearance of dragon flies or "mosquito hawks" that preyed on the adult mosquitoes.⁶

The records for hospital admissions,

* Presented at the Medical Service Corps Section of the 61st Annual Convention of the Association of Military Surgeons, at Hotel Statler, Wash., D.C., Nov. 29-Dec. 1, 1954.

† Preventive Medicine Division, office of Surgeon General, Department of the Army, Wash. 25, D.C.

‡ Preventive Medicine Division, Bureau of Medicine and Surgery, Department of the Navy.

§ School of Aviation Medicine, Gunter Air Force Base, Montgomery, Alabama.

deaths, and man-days lost because of arthropod-borne diseases in the Armed Forces during World War II provide ample indication of the need for entomologists in the Armed Forces. These records are summarized below.

Over one million persons were admitted to hospitals as a result of diseases acquired through the bites of insects. An unknown portion of an additional million must attribute their illnesses to contamination of food by insects. Death claimed 1,012 persons among these two groups, and a staggering total of over 24 million man-days were lost due to these diseases—over 16 million due to diseases unquestionably transmitted or caused by insects.

Where do we stand today with respect to our prospects for preventing or controlling the diseases wholly or in part arthropod-

transmitted and of actual or potential military importance? These diseases may be classified with respect to their military importance and geographical distribution as follows:

1. Diseases of potential military importance with wide geographical distribution.

Enteric Diseases: Effective immunization procedures are available against typhoid and paratyphoid fever. However, effective immunization or drug prophylactic procedures are not available for other salmonellosis, or bacillary or amoebic dysentery. Strict sanitary discipline is effective in reducing the incidence of these infections. Control of filth flies has become increasingly difficult in recent years due to the widespread development of resistance to the chlorinated hydrocarbon insecticides. These diseases should not become important in a well disci-

MAN-POWER TOLL ATTRIBUTABLE TO ARTHROPOD-BORNE DISEASES IN THE ARMED FORCES
DURING WORLD WAR II (1 JAN 1942 TO 31 DEC 1945)

Disease	Number of Cases	Number of Deaths	Estimated Total Days Lost ^a
<i>Diseases Primarily Arthropod-borne</i>			
Malaria	694,935	377	12,105,000
Filariasis	14,523	1	1,076,000
Dengue	128,524	8	939,000
Scrub Typhus	6,054	312	560,000
Encephalitis, acute infectious	892	78	72,000
Other arthropod-borne diseases ^b	21,446	30	230,000
Arthropod infestations	134,368	0	1,224,000
Sub-total	1,000,742	806	16,206,000
<i>Diseases Transmitted in Part by Arthropods</i>			
Diarrhea and dysentery ^c	974,246	155	7,900,000
Typhoid and paratyphoid fever	1,632	47	112,000
Tularemia	214	4	22,000
Sub-total	976,092	206	8,034,000
Total	1,976,834	1,012	24,240,000

^a The days lost by Army personnel are estimated; the Navy non-effectiveness is not.

^b Refers to the following diagnoses: Sandfly fever, leishmaniasis, trypanosomiasis, typhus (other than scrub), relapsing fever, and Rocky Mountain spotted fever.

^c Includes the following diagnoses only: amebic dysentery, bacillary dysentery, unclassified dysentery, enteritis, colitis, enterocolitis, ileitis, gastroenteritis, and diarrhea (not elsewhere classified).

SOURCE: Army data—Preliminary sample tabulations of individual medical records. Navy data—*The History of the Medical Department of the United States Navy in World War II: The Statistics of Diseases and Injuries*, Volume 3, NAVMED P-1318.

plined Army, but devastation of civilian communities by bombing could increase the potential danger.

Malaria: Postwar research has contributed highly effective drug prophylaxis, which is, however, dependent upon strict discipline. Methods of protecting the individual soldier from the vector through the use of repellents and protective clothing are moderately effective but again depend largely upon individual initiative and discipline. Environmental protective measures can be effective in stabilized situations but are not usually applicable in the forward areas of a combat zone. Malaria should not again be a major cause of time lost in a well disciplined Army, but could again cause concern in the event of disorganization and disruption of command channels and supply lines.

2. Diseases of potential military importance currently with limited geographic distribution.

Cholera: This disease could be of importance in the event of large scale military operations in India, China, South East Asia, the Balkans and Middle East. Immunization is of doubtful value and the prophylactic use of antibiotics has not been evaluated. Sanitary measures are normally effective in prevention. Flies contribute to transmission through the contamination of foods. Development of resistance to insecticides by filth flies in the areas involved can be anticipated and would make their control difficult.

Plague: The human form, once widely distributed over the world, now occurs chiefly in India, China, Burma, the Middle East, Africa, and South America, and might well be of importance in the event of military operations in these areas. Immunization and drug prophylaxis may be of some value. Personal and environmental protective measures involving rodent and flea control are effective when properly applied, but require organized control methods and strict discipline.

Yellow Fever: Effective immunization procedures are available and the urban

mosquito vector is relatively easy to control. The disease should be readily preventable in military forces operating in endemic yellow fever areas. However, introduction of yellow fever into certain populous areas where it does not now occur could result in explosive outbreaks in the civil population before control measures become effective.

Epidemic Hemorrhagic Fever: Immunizing and drug prophylactic procedures are not available. Personal and environmental protective measures directed against the presumed rodent reservoir and mite vector appear to reduce the incidence of cases. Effectiveness of preventive measures against other regional hemorrhagic fevers is problematical.

Typhus Fevers: Immunization procedures and personal and environmental protective measures against louse-borne epidemic typhus are extremely effective, and this disease should not be a major problem in the Armed Services. Disruption of sanitary facilities and lack of supplies could result in outbreaks in civilian communities. Immunization against murine typhus is available, but untried in military populations. Personal protective measures against the flea vector are only moderately effective. Environmental control measures can be effective under stabilized conditions. No effective vaccine has been developed against scrub typhus, but some of the newer antibiotics can be used prophylactically. Rodent control and the use of mite repellents will reduce but not eliminate the disease, which would be a potential threat in the event of operations in areas where it is endemic.

Q Fever: This disease has caused sharp outbreaks effectively immobilizing military units. Its mode of transmission is not well understood and methods of prevention and control are inadequate. Ticks have been found naturally infected in several parts of the world. Methods for their control are not completely satisfactory.

Dengue: This incapacitating disease could be of considerable importance in many tropi-

cal and subtropical areas. Effective immunization has not yet been perfected and drug prophylactic procedures are not available. Personal and environmental protective measures, involving the use of repellents, protective clothing, and insecticides against the mosquito vector can be effective but require adequate organization and discipline.

Relapsing Fevers: No immunization or prophylactic measures are available for either the louse-borne or tick-borne types of this disease. Personal and environmental measures against the louse vector should prevent the louse-borne disease from becoming a serious military problem. Control of the tick vector is less effective and the disease could become troublesome to military personnel operating in South East and Central Africa, Central Asia, Palestine, and Tropical America.

Arthropod-borne Encephalitides: These diseases in one form or another occur in many parts of the world, and assume military significance when localized epidemics occur. Large-scale immunization procedures have not been proven to be effective. Personal and environmental protective measures directed against the mosquito vectors should be reasonably effective in protecting military populations.

Sandfly Fever: This incapacitating disease could be a military problem to non-immune troops during campaigns in a number of tropical and subtropical areas, including China, Burma, and a belt around the Mediterranean Sea. No effective vaccines or prophylactic drugs are available. However, protection from the sandfly vector can be readily obtained through the use of repellents and insecticides, and the disease should not be a major military problem.

The Spotted Fevers: This group of fevers are of importance only when troops operate in endemic areas. There is an effective vaccine against Rocky Mountain spotted fever, but not against other fevers of this group. Impregnated uniforms afford considerable protection against the tick vector, but the value of environmental control

measures has not been adequately determined.

Filariasis: Methods of immunization or drug prophylaxis are not available. Many species of mosquitoes are capable of transmitting the microfilariae causing the disease, and complete protection through control of the vector is difficult.

Trypanosomiasis: No satisfactory vaccine is available against either the African or American form. Drug prophylaxis has shown promise against the African form but has not been evaluated in a military population. Control of the vectors (tsetse flies and cone-nosed bugs) is difficult. This disease is unlikely to be of military importance, but would be of concern in the event of operations in endemic areas of Africa or Central or South America.

Leishmaniasis: Visceral and/or cutaneous forms of this disease are prevalent in China, India, the Mediterranean area, Tropical Africa, Asiatic Russia, the Middle East, and parts of South America. No means of immunization has been discovered. However, effective means are available for protection from and control of the sandfly vectors.

This survey of our state of readiness with respect to prevention of the arthropod-borne diseases indicates that the role of the entomologist in the preventive medicine program of the Armed Forces is indeed a large one. Much remains to be done in research and development in order to better understand the relationships of arthropods to disease, and in the development of effective control measures applicable to military usage. In the event of military operations in areas where these diseases are of importance, the entomologist must provide leadership in organizing and conducting effective control programs, taking into consideration in developing those programs the many factors that must be evaluated, including available methods for prevention and control of the disease other than vector control. For instance, in the light of currently available preventive measures, the preventive medicine officer or entomologist planning a con-

tol program for the protection of military personnel in an area where both malaria and sandfly fever were potential hazards might well decide to concentrate his efforts on sandfly control rather than control of anopheline mosquitoes, and rely primarily on drug prophylaxis for the prevention of malaria.

The Army, the Navy, and the Air Force have all recognized the need for entomologists, and military entomologists or civilian entomologists under military contract are now working in many parts of the world on problems of military importance. A number are engaged in various phases of research and development, including broad studies of arthropods as vectors of disease; the epidemiology of arthropod-borne diseases; insect physiology and genetics with particular reference to insecticide resistance; the biology, ecology, and classification of medically-important arthropods; studies of methods for the protection of individuals and groups from arthropod attack; and the development of improved insecticides, repellents, and various types of dispersal devices suitable for military use. Others are actively engaged in conducting control operations against arthropods both of medical significance and economic importance.

Preventive medicine is the concern of every member of the military services, and every officer and individual soldier, sailor, or airman, should understand the basic principles of preventive medicine and know what he is expected to do for himself to prevent illness. The entomologist assists the preventive medicine officer in the education of troops in health matters, particularly in the indoctrination of troops in the prevention of arthropod-borne diseases. Others staff troop units specifically designed for field service in preventive medicine activities. Still others are involved in the necessary functions involved in the administration of large organizations. These individuals develop directives, training aids, and technical manuals; assist in the procurement and distribution of supplies, and

provide other administrative services with particular reference to entomological problems.

Four of the technical services of the Army utilize entomologists. The Medical Service entomologists usually have commissioned status and serve on various headquarters' staffs, at service schools, at laboratories, and as officer personnel of the Preventive Medicine Units. The Medical Service also supports an active entomological research program through contracts with civilian institutions and universities.

The Corps of Engineers employs civilian entomologists to develop and supervise the insect and rodent control program at fixed military installations. Their work encompasses the preventive medicine as well as the economic aspects of insect control.

The Quartermaster Corps utilize entomologists, as well as chemists, in meeting its responsibility for the development and supply of insecticides, rodenticides, and repellents for military usage.

Civilian entomologists of the Chemical Corps are engaged in fundamental studies of insect physiology and the mechanism of action of insecticides, rodenticides, and repellents.

The utilization of entomologists by the Navy parallels that described above for the Army, except that the Bureau of Yards and Docks is the agency responsible for insect and rodent control at fixed military installations. The Bureau of Ships develops military insecticides, rodenticides, and repellent items, and the Office of Naval Research is charged with the accomplishment of civilian contracted basic research in the field of insect and rodent control.

From the time of its inception as a separate organization in 1947, the Air Force Medical Department made provision for Medical Entomologists in their allocation of Medical Service Corps personnel. Not all of the allocated slots have been filled, but projected plans call for entomologists with all of the major commands and numbered Air Forces, as well as with epidemiological

flights, and in research and teaching assignments.

The Air Force has recently organized an insect and rodent control program under the Directorate of Installations, which utilizes civilian entomologists to direct the program for the control of pests of medical and economic significance at fixed Air Force installations. Medical entomologists provide technical guidance for those phases of the installations program concerning insects of medical importance.

Thus it can be seen that the role of the entomologist in the preventive medicine program of the Armed Forces is that of a supporting player in the drama of Military Preventive Medicine. He must play that role in harmony with the other members of the cast, particularly the Preventive Medicine Officer and the Sanitary Engineer, in order that the objective of the Military Preventive

Medicine Program—the preservation of the fighting effectiveness of the Armed Services—can be maintained.

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The Psychopath Under Stress in the Military Service

By

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IT IS important that officers with command function, especially on the company level, have some conception of the make-up of the so-called psychopath so that this type of individual may be recognized and handled properly. The writer in his capacity as a surgeon to a National Guard Regiment on an annual fifteen-day encampment had occasion to study at first hand the actions of two psychopaths who, when confronted with seemingly innocuous environmental stress, acted in an irrational, impulsive and immature manner.

Freud defines permanent character traits as perpetuations of instinctive impulses which are interchanging. These original impulses may be either sublimated into behavior

acceptable to society or the person may develop neurotic defenses that act as a barrier to the eruption of the instinctual impulses into consciousness. The psychopath develops character traits which are the very epitome of the original instinctual impulses and are only thinly disguised, if at all. He is unable to either sublimate his aggressive instinctual urges or envelop them with neurotic defenses. In other words, he directly "acts out" his impulses and so comes into conflict with society. The psychopathic personality acts impulsively in a situation of stress and shows a marked lack of consideration for the moral precepts of society. He is a non-conformist, rebels against authority, but may be ingratiating when it suits his purpose. He is unable to learn from experience, is unreliable and has little sense of responsibility. He is the wise-guy, know-it-all member of the group who shows a marked lack of consideration

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for the sensibilities of his fellow-man. This type of individual was formerly called "Constitutional Psychopath" as it was thought that there were major inherent defects in the genes which was responsible for the distorted character traits. This concept is no longer tenable, although there are people with abnormal permanent character traits that defy therapy of any type.

We may state that the super-ego, or conscience of the psychopath, although present, is pathologic. This is due to the fact that in the most important formative years of early childhood when the very foundation of the personality structure is laid down, the embryo, immature ego, is unable to identify with significant, appropriate mature parents or parent surrogates. The psychopath, invariably gives a history of a broken home, where a feeling of loving and being loved, where a sense of security and warmth is utterly lacking. By a broken home, the writer means not only one in which either or both parents are missing because of death, divorce or whatever, but also one in which love, affection, and respect are not present—in parents who though physically present in the home are themselves immature individuals, either those with unhealthy permanent character traits or neurotics who are incapable of "giving" either to their respective spouses or children. Parents who are rejecting to the children, who are emotionally unstable and whose behavior shows ambivalent attitudes, makes for perplexity and confusion in the child so that he is unable to discern what his future role in life will be. Because of the lack of loving parents when the child's super-ego or conscience is forming, the child is unable to work out and properly sublimate his aggressive feelings and becomes the type of individual who later in life exhibits behavior which is unacceptable to society. The psychopath under stress acts out his instinctual urges impulsively, with a weak super-ego or conscience unable to take its rightful role, and stem the tide of unacceptable behavior patterns.

In the official Classification of Mental Dis-

orders published by the American Psychiatric Association, the term "Personality Trait Disturbance, Emotionally Unstable Personality" now takes the place of the term psychopath. The Manual states "the individual reacts with excitability and ineffectiveness when confronted by stress. His judgment may be undependable under stress and his relationship to other people is continuously fraught with fluctuating emotional attitudes because of strong and poorly controlled hostility, guilt and anxiety."

The following two incidents graphically portray the actions of psychopaths under relatively minor stress.

The first incident concerns a 24-year old corporal who was assigned as an instructor of a special company of raw recruits who were receiving indoctrination at their first 15-day encampment. The corporal, who was lecturing, became incensed when he heard some whisperings and titterings in the class. He decided to punish the entire group of men by having them run around the barracks a number of times in the hot early afternoon sun. A number of the men fainted as a result. That evening some friends of the neophytes decided to have a "talk" with the corporal. When he saw the group approaching his barracks, he became panic-stricken. He loaded his 45-caliber pistol and rushed out to meet the group, brandishing the weapon in a threatening manner. Luckily he was soon overpowered and a possible tragedy was averted. The writer was asked to interview the corporal. Pertinent facts in the history revealed that his mother was a domineering, rejecting figure and his father a weak, passive, dependent type of person who was unable to assume the responsibilities as the head of the household. There was a history of truancy, lying, and trouble with the law over minor offenses in the teens, and he developed into an aggressive, swaggering bully. He was a poor student in school, quitting in the 10th grade. His work record revealed frequent changes due to clashes with his employer. Although married, he was not making a good heterosexual adjustment.

The second incident concerned a 26-year old master sergeant. During a field exercise, the sergeant was assigned to the "aggressor forces" whose job it was to attempt to infiltrate the defensive lines. He suffered the humiliating experience of being captured by soldiers on the defense who were non-combatant troops and who were guarding the perimeter of an area in which service troops were bivouacked. The sergeant became enraged, resisted capture fiercely and actually had to be subdued by force. He became quite threatening and after being released stated words to the effect that he would "get even." That night he stealthily returned, threw a smoke bomb into the command tent and then cut the ropes of the large tent housing a number of troops. The commanding officer of the unit was hospitalized for severe bronchitis as a result of inhaling the irritating smoke of the bomb. In addition, the center pole of the large tent collapsed and a large pole crash just inches away from the head of a sleeping guardsman. Through some miracle no serious injuries were incurred. It was amazing to the writer that an aggressive type of personality of this kind had managed to become a master sergeant. An interesting factor in regard to this is that the company to which this soldier was assigned was the poorest trained and had the lowest morale.

This psychopath also gave a typical history of the development of a personality trait disturbance. A lifelong rebellion against society with poorly controlled hostility was quite evident. It is interesting to note that this soldier was attempting to act out his aggressive impulses in a socially acceptable manner by becoming a boxer. He was not too successful in this because upon being hit by his opponent, he becomes enraged, loses all sense of proportion and becomes an easy target for his adversary.

DISCUSSION

Although it is impossible to weed out all the psychopaths from the service, the com-

manding officer of a unit should be familiar with the essential make-up of the individuals and the potential dangers inherent in placing them in positions of trust in the unit. The commanding officer should be especially wary of giving such individuals command function over troops because of their low threshold of frustration and their inability to act in a rational manner in a stress situation. It must be remembered that the diagnosis of psychopathic personality reflects a lifelong pattern and the life history is its major determinant. The two psychopaths portrayed above are examples of the type of individual who should be discharged from the service as soon as possible. The unit psychiatrist should be consulted as to diagnosis and final disposition of the type of "characters" described above. It is important, especially in combat units, that the psychopath be recognized early before the unit reaches a combat zone. Such individuals because of aberrant character traits may be on a par with enemy units when it comes to potential danger.

SUMMARY

1. The concept of psychopathic personality is discussed, and graphically portrayed by two incidents that occurred during a National Guard annual summer encampment.
2. The soldier who evidences poor adaptive capacity of coping with relatively minor stress should be weeded out of the unit, as soon as possible, or if the circumstances do not permit such action, should not be placed in command of troops.

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The Role of Psychology and Social Work in the Preventive Medicine Program of the Armed Forces*

By

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THE role of the psychologist and the social worker in the preventive medicine program of the Armed Forces has significantly advanced to a point where fruitful collaboration with medical men is feasible and well in process of development in the accumulation of new knowledge and skills for the preservation of the health and the treatment of illness among Armed Forces personnel.

It is well for social scientists, especially psychologists and social workers, to realize that their disciplines only recently have been adequate in concept, research method and substantive conduct for purposes of medical care and research. With the clarification of the function of the psychological, social and cultural dynamics which thrust directly upon and largely determine human adaptation, the lines of thought and types of research in the several fields are converging. There is a consequent merging and reinforcing of the formulations of psychosocial dynamics in personal and group adaptations. Psychological and social formulations are being related conceptually and with practical intent to findings in the biophysical field.

In the study of the individual and social components of illness, the integration of psychosocial and biophysical theories offer a real challenge. It is here that the varied approaches for both application and research are brought together to provide a broader basis for diagnosis and a more comprehensive foundation for programs of prevention and treatment.

It is no longer tenable to consider or to treat the illness of patients by procedures

based solely upon a physical basis and exclude psychological and social components. The study of the psychosocial elements in the prevention and treatment of illness is being effectively pursued.

In general, professionally trained psychologists and social workers cannot become expert physicians any more than physicians can become competent psychologists and social workers. The problems, concepts, and methods of each discipline are far too time consuming in training and practice to permit one individual to master the combined skill and knowledge needed to advance preventive and research aspects of the sociomedical field. Sociomedical collaboration is needed for alliance and cooperation, inasmuch as the physical, psychological, social, and cultural aspects of human life always come to a focus, in health or in illness, in a single individual.

The problem of personnel stability, both as to losses through disability separations and retirement (30 per cent are for psychiatric reasons in the Air Force) and the large numbers by expiration of term of service certainly do relate to morale, which encompasses challenging areas for both psychologists and social workers. There is reason to think that personality breakdowns are relatively infrequent in groups whose morale is high, and that "morale" is a name for the powerful feeling released in the individual who feels himself a member of a strong and important group. Likewise, where morale is high men may be expected more frequently to remain in the service.

There is a real awareness of the personnel stability problem throughout the services. There is a basis for real concern. The writers of an AWOL study, published by the

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Air Force Technical Training Command, spell out factors basic to this concern that "we, in the Air Force, do a fine job of seeing to it that the 'climate' is right for working many of the materials and machines we use. We warm up airplane engines before we fly them. We use refrigeration on rivets and certain airplane instruments in the process of repair. In our printing shops we set the 'climate' so the ink will neither blur nor leave the fine lines blank. We have applied science, and can stand critical analysis in these areas. We have not been as scientific nor can we stand critical analysis as well when it comes to establishing the proper 'climate' conducive to building high morale in our personnel." Why is it that social scientists are not enabled to assume their rightful role of practical importance for social policy in what has been called the "Number One Problem" of the services? Are we afraid of criticism? Science is criticism, and social sciences imply criticism of society. Perhaps the reluctance to use the skills and methods of the social sciences, including psychology and social work, rests in a fear of criticism.

Let us look at "morale" a little more carefully, because it is a key concept basic to the services' mental hygiene programs, which stress the preventive aspects in personal and group adaptations of our service personnel.

Here we refer to *group* morale—morale as the relation of the group toward its goal, say to be the best trained company, and the relation of the members of the group to one another. If the personnel of the company develop a collective goal which is highly valued, they become much more disposed to fellowship. Conversely, if the personnel have a strong feeling of common identification, and sense in one another congeniality and a readiness to mutual aid, there are imparted extra significance and value to the goal. The important point is that group morale is a collective product in the sense that it arises from the response of men to one another and to the symbols of one

another; the image which the personnel have of the group goal is dependent on the way in which the goal is pictured to them by the actions and expressions of one another. Morale then exists as a disposition to act together toward a goal, and it is a shared product of the reciprocal relation between the common goal and fellowship. The two fundamental features of group morale are simply *purpose* and *cooperation*.

We must realize that morale does not come from providing our personnel with entertainment, amusement and the facilities of relaxation. The arrangement for shows, theatrical performances, dance bands, library material, athletic contests, dances and socials ranks high in current efforts to establish morale. Without minimizing the value of these activities for emotional balance, or the way in which the efforts to provide them may give an impression of the interest of other people in one's welfare, it is clear that they do not meet what is necessary in group morale. The necessary feature is the formation of a highly valued goal. Efforts centered around entertainment characteristically are not directed to a highly valued goal.

In a similar manner we might discuss current views of morale such as that it is to be achieved through the formation of individual character, through adjusting personnel to their life-situations and circumstances, through rigorous discipline, through the development of a spirit of toughness, through the development of good leadership, through the stimulation of hatred of the enemy, and through the generation of emotional enthusiasm. All of these views do not meet what is crucial in group morale. These features will not create morale. We must understand that morale is the disposition of the group to act together toward a collective goal and that accordingly its strength depends on how the goal is conceived, on the feelings and interests developed around it, and on the mutual support which the personnel sense in one another. If the goal is highly valued and the sense of mutual effort strong, morale is high. It is not necessary for

the men to have a clear understanding of the value of their goal—all that is necessary is that they sense or feel its importance. It seems clear that the development of morale takes place around the process of defining and forming the goal and around the cultivation of the sense of common effort.

It is reasonable to assume that if morale were understood and action implemented in accordance with the viewpoint presented above, significantly greater numbers of service personnel would not be leaving the armed forces at the expiration of their term of service, and that the health level of personnel would be increased significantly, especially with regard to disability separations and retirement for psychiatric reasons. And psychology and social work are vital to implement such a needed program.

The crucial importance of the group in the squadron for military effectiveness may be seen from various points of view. To the psychiatrist, psychologist and social worker, a typical sign of the military useless neurotic or psychotic airman is the fact that he is not part of his group. An outstanding trait of essentially all patients admitted to the psychiatric wards of service hospitals is their inability to become part of, and find strength in, the group. Psychology has significantly established that an *isolated* individual is sick.

We need to look to and to utilize psychology's and social work's knowledge of individual and group behavior and of social conditions and military community relations which is based on the modern social sciences. On the basis of this knowledge psychologists and social workers contribute to the group with which they work a skill in leadership which enables the personnel to use their capacities to the full and to create socially constructive group activities encompassing highly valued goals. Psychologists and social workers are aware of both group activities and of the interplay of personalities within the group and its surrounding community. The social group worker especially makes use of his relation to the group, his knowledge and understanding of the individual

and of the group process and recognizes his responsibility both to individuals and group with whom he works and the service he represents.

The complexities of modern-day military management and organization make it mandatory to look to the social sciences to do their part in preventing and solving the problems of human relations. Psychologists and social workers are professionally trained for this task, and they are eager to assume the challenge and to perform their rightful role in the military community.

It is estimated that the average training cost of an airman is \$14,000. The eventual bill for replacing approximately 150,000 airmen who are expected to accept their discharge papers during this fiscal year will total the staggering sum of over two billion dollars. Does not such a cost, not including perhaps more costly factors related to our national defense, demand the participation of our social scientists—our psychologists and social workers—in a total program of applying present knowledge and significant research in preventing and solving the human relations aspects involved in the problem?

I might well have dealt with more specific and detailed aspects of the role of psychologists and social workers in the preventive medicine program of the armed forces, but interesting and informative as these aspects are, it seems that the more general matters discussed are presently more important. To be sure, psychologists and social workers share a significant preventive function in classification and assignment of personnel programs, lecturing to new personnel on personal adjustment, counselling on social problems, and orienting troop leaders to personal adjustment methods, participating in therapy and disposition programs in mental health and hospital activities, all of these activities in settings including general and station hospitals, training divisions, and disciplinary barracks.

In conclusion, we might well state that psychology's and social work's fundamental objective is the social adaptation, health and

relatively continuous well-being of each service man in the military culture. It is possible to clarify measurably how within the military environment personnel may develop inept protective reaction patterns when group morale is low. Linking psychosocial and biological dynamics in the experience of illness, provides significant ways to preventive medical care. Certainly we can begin to

know the price we pay in illness and maladjustment of our military personnel. With knowledge obtainable from the social sciences we may reduce the toll; or develop competence to deal more effectively with the hazards involved.

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How We Do Team Nursing*

Jointly Prepared by the Nursing Staff
VA Hospital, Bronx, New York

HOW WE INITIATED THE USE OF THE TEAM CONCEPT

THEY tell us it is no longer fashionable to have problems, that good Administrators have interesting situations. We felt that we had one of those interesting situations in the fall of 1950 when we met for a regular evaluation conference. We were particularly interested in the aide training program. Three new VA hospitals would soon be recruiting professional nurses from the areas we had been able to plan on in the past. More than ever, we needed a well trained efficient aide group. We felt that our training program as established, was sound, but were unable to provide adequate follow-up with limited number of nurse instructors. Our turnover rate in the hospital aide group was not high in comparison to the rate of other hospitals in the area, but we were convinced that we should try all the tools available to decrease that rate and thus release our instructors for more ward supervision. We had previously reviewed our screening process and made some improvements. The next question was—are our aides getting the maximum amount of satisfaction from the job they are doing? Since satisfaction and morale seemed the same to us, we checked with the authorities.

These experts say that good morale is based on the knowledge that the employees effort is being expended for a good purpose; that he has a good knowledge of techniques; a sense of fair treatment; a sense of belonging; a sense of permanency and tenure; a knowledge of progress and results; and has an opportunity to assume some responsibility. A member of our group pointed out that we were inviting our aides to listen to the morning report but that they seldom had an opportunity to know the total nursing care plan. Aide assignments were being made without consideration of the needs of the individual patient or the ability of that particular aide to supply those needs. Frequently the aides expressed the opinion that the nurses were expecting them to do all the work.

Previously our Nurse Consultant had enthusiastically reported to the nursing staff on the work being done on a plan for organizing nursing staff to achieve patient centered care. This plan recognized the need and provided a solution to the problems we were discussing. The need for better communication; better understanding of the purpose for which each member of the staff was working; the contribution made to the total care by each worker; and, finally, more effective use of personnel.

After we determined that the use of team concept seemed to be a good tool to bridge the gap in planning, we scheduled group

* Reprinted—Department of Medicine and Surgery, Veterans Administration Information Bulletin (IB 10-57).

meetings on each ward unit for the purpose of stimulating interest, getting a fresh viewpoint from the workers, and getting background for further planning. The Assistant Chief, Nursing Service, responsible for selection, assignment, and utilization of aide personnel, and the instructor in charge of the aide training program, presented an outline of the team concept and how it would operate in the individual units. They asked for suggestions from the group and promoted group discussions for and against the proposed change. The group leaders were gratified with the amount of enthusiasm from the workers, particularly that expressed by the aide group. The nurses generally felt that the plan was good, but where were they going to find time to schedule team meetings. They were apt to concentrate on the problems that would present themselves when one or two members of a team were absent for illness, or scheduled days off, or leave.

One of our instructors analyzed the available literature on the team, compiled a bibliography, and prepared a handout, "Guide for Organizing the Team." In addition, the local district of the American Nurse's Association staged a symposium with role playing. A large proportion of our professional nurse staff attended this meeting.

Almost at once, one of the ward units indicated that they would like to try using the team concept. We weren't sure that we were ready to start, our ward units seemed more enthusiastic than our supervisory staff and we had discussed the use of the team with the Chief of Professional Services, but we hadn't presented it to the doctors who were working on the wards. However, we were so sure that this method represented an improvement, that we decided to start even though we were "half" ready. We assumed that the staff on the ward would be our best salesmen after they experienced the benefits of this type of assignment, and they were. However, in retrospect, we think progress would have been steadier if we had assured ourselves that the supervisors were as well informed about what we were trying to do

as we were. They were cooperative but not as able to participate as much in the planning as they were later.

Even though all the members of the staff on this particular unit seemed enthusiastic, we soon found that initiating this change required the help of a member of the staff with a thorough knowledge of the team concept and how it operates. The team leaders especially needed help in evaluating personnel, planning work assignments, and conducting team conferences.

The team concept highlighted some of our personnel management problems and directed attention to deficiencies in the members of our staff. For instance, it was very apparent that graduate nurses generally needed help with supervision of auxiliary personnel; they needed to develop qualities of leadership. The staff nurse in any hospital situation today cannot be a follower only. The next step included a plan to give all nurses the course in Leadership and Supervision. The education department was able to adapt the guide outline set up by Central Office to our immediate needs. This course is now a part of our orientation program.

In addition, staff conferences were held. The philosophy of the team method and the role of each member functioning on the team was discussed. We used role playing, exhibits, and handouts were available. The staff on the test ward was anxious to sell the idea. At the first conference one nurse said she was on night duty when "all this started and as much as she hated night duty she was tempted to request to remain on nights." She later said the thing she dreaded most; "wasting time in conferences" on the days that were "short staffed" was no problem at all, because the time spent in planning paid dividends.

Instructors next planned individual conferences on each ward unit to discuss with the personnel concerned those aspects of the change that would present problems to them. Sometimes the staff would feel that it was impossible to use the team on their unit because of existing plans for treatments. It meant rescheduling treatments or ordering

an additional dressing cart. These adjustments were relatively simple.

As more wards initiated the program we heard less and less of the old reasons (not enough help) for not using the team concept. They were finding that the team concept helped them utilize personnel to a greater extent. On the evening and night tour of duty the personnel assigned operate as one team. The head nurse appoints team leaders, assigns patient load as well as special ward duties. The assignment of the team members is made by the team leader. She encourages cooperative planning but guides them to the consideration of the right person for the right job.

The use of the team method of assignment does not relieve the head nurse of any responsibility but it redirects her activities in handling those responsibilities. It took a little discussion before some of our head nurses appreciated how important it was to direct staff through the team leader. We eventually established workshops for head nurses to give the head nurse a better opportunity to see how she could help in planning and participating in team conferences without interfering with team leadership. She learns to evaluate the team in action and identify problem areas.

The team methods of assignment differs most from other types of assignments in its planning. This difference is emphasized in the team conferences. Each morning the individual teams meet to plan together their work for the day. The usual time for this meeting is following the morning report from the night nurse. However, on some of the wards, this is not practical because breakfast trays have arrived and need to be served—or patients have to be prepared for surgery, or temperatures and weights need to be done; on a few of the wards doctors' rounds are bright and early. When these conditions exist, the morning conference must necessarily be held later. None, however, are held later than 8 a.m., nor do they last longer than 10 to 15 minutes. It is at this morning conference that each individual

member of the team helps in planning to share the workload for the day. The team leader assumes the responsibility of bringing to the team members the actual work situation, and makes provisions for attending to the emergencies that may arise.

Every afternoon the teams come together to discuss their day. At this conference each team member is expected to participate and to discuss his or her contributions to the nursing care of the patients. It is here that necessary changes in plans are made, methods reevaluated, and most of the teaching takes place. On wards where the morning conferences are held late, plans for the first hour of the day must be begun in the afternoon conference. The greatest satisfactions with this new method of assignment reported by the aides is that in the afternoon conferences they are able to learn more about the condition of their patients. Here, the opportunity is given them to share information concerning the patients' emotional status, their reactions to therapy, and their plans for the future. The nurses become teachers in the real sense when they explain the fundamental principles underlying the therapy instituted for particular patients, as why two patients with the same diagnosis are treated differently, or why it is necessary to take the pulse of a patient receiving digitalis derivatives before administering the drug. The nurse leaders of our group are clearly identified at this time.

We were also able to provide our staff with some of the tools for better group management available in the current literature on group dynamics. Members of the instructional staff devised a questionnaire to stimulate their interest in better group management.

In addition, regularly scheduled team workshops help team leaders to develop a vocabulary that is more readily understood by the aide group. This workshop also helps them to identify nursing problems and improves their ability to do effective patient teaching.

If we were initiating this program to-

morrow, instead of 1950, we would start by including the supervisory staff in the earliest planning. We were deprived of some of their most valuable early assistance because we lost sight of the fact that any improvement in administrative techniques improves the whole and lightens everyones burden.

Our plans would give recognition to the need for help in the areas of leadership and group management. This help should be available to the staff with the introduction of the team concept.

HOW WE ORGANIZED THE NURSING TEAM

What is the team? A group of persons working toward a common goal. A Nursing Service team is a group of professional and nonprofessional Nursing Service personnel working together in planning, giving, and evaluating patient-centered nursing care to a group of patients.

What makes up the team? On the health team the members are the doctor, the nurse, the social worker, the nutritionist, the various technicians, and other allied health workers. On the nursing service team are the head nurse, team leader, staff nurse, aides, porters, cleaners, and others in direct contact with the patient.

How does the team function? There are certain nursing functions which have to be performed, and which vary in complexity and difficulty from the simplest task—such as those performed by a mother for her baby—to the most complex functions of the professional nurse. These functions are divided and allocated among various workers on the hospital team. The chief criterion for division of these functions depends upon the kind of preparation that each worker brings to the job. The commonly used method of case assignment, without sufficient regard for the workers preparation, may result in unsafe practices, and is to be avoided. Nor should assignments be based on jobs to be done. Rather, they should be based on the patient's individual needs. The individual patient's nursing problems are the point of departure, and each worker functions ac-

cording to his abilities and preparation, contributing his share to the team's job. A nurse functions as team leader, and with democratic principles inherent in the concept, each team member realizes his importance to the team's goal—that of providing effective individualized nursing care.

How does the nurse function on the team? The function of the nurse may be said to parallel that of the doctor. Just as he identifies and diagnoses the medical problem, then plans and prescribes treatment, so does the nurse identify and diagnose the nursing problem, then decides upon and develops a course of nursing action. This means that the nurse must be equipped with a wide store of knowledge, judgment, and skill.

What are the responsibilities of the head nurse? Good leadership by the head nurse is essential for the successful functioning of all nursing teams within the unit. The example set by the head nurse who understands and applies democratic leadership is reflected in the democratic working of the team leaders, and, in turn, of the teams. The head nurse is responsible for:

A. Assigning the responsibility for nursing care of patients, and seeing that it is done in accordance with doctor's orders and high standards of nursing. In other words she—

1. Identifies each patient's nursing problems and assigns, and places them within the ward unit, accordingly.
2. Chooses team leaders according to their leadership abilities and nursing proficiency.
3. Consults with team leaders in assigning personnel to the teams.

a. Patients assigned to a given team should be placed in one part of the unit, or all patients in a specific section should be assigned to one team. This eliminates unnecessary travel, conserves time and energy, and facilitates intra-team communication.

B. Instructing team members in carrying out new or unfamiliar procedures, and helping them to develop skills and the ability to

carry out the technics involved in giving good nursing care.

C. Planning time schedule for personnel, taking into consideration the following:

1. Personnel policies regarding on duty, holiday, and annual leave time.
2. Maintenance of stable composition of the teams.
3. Provision for continuity of care:
 - a. Make out schedule ahead of time.
 - b. Provide relief for days off within the team itself.
 - c. Revise the composition of the team in case of illness, rotating tours of duty or transfers.
 - d. Revises grouping of patients assigned to teams as patients' conditions change or as new ones are admitted.

D. Helping to maintain patient-nurse-aide relationships which will enable the team to function with maximum smoothness and efficiency, and to ensure a restful, friendly atmosphere for the patient.

E. Directing and evaluating the total program of patient care in her unit.

F. Spending some time with every patient and worker at least once a day.

G. Conferring with team leaders individually and as a group at least once a day.

H. Identifying potential team leaders and spending time grooming them for leadership.

What are the responsibilities of the team leaders?

The team leader:

A. Reports on duty and receives the report and instructions from head nurse.

1. Do aides hear report? If not, why?
2. If reason valid, will team leader give report?

B. Consults assignment sheet, doctor's orders, and kardex.

C. Identifies the patients' nursing problems (physical, mental, emotional, spiritual and social) and determines which can be cared for by the aide, by the nurse, or by both together.

D. Interprets nursing problems to co-

workers and seeks their cooperation in planning.

1. Leader and coworkers sit together and plan for carrying out their assignment.
2. Assignments within the team should be written by aides, etc., in own notebooks.

E. Evaluates and records results of nursing care:

1. Records and assists other team members (if any).

F. Conducts daily team conference:

1. Exchange information.
2. Answer questions.
3. Report observations.
4. Evaluate progress.

What are the responsibilities of the aide?

- A. Directly responsible to team leader.
- B. Carries out care as agreed upon.
- C. Makes daily observations of patients.

D. Reports information of patients to team leader who completes the charting for the team. This is necessary in order that a complete concise report may be made to the next team coming on duty.

Advantage of working on the team:

A. Nurses can care for a greater number of acutely ill patients.

B. Nurses are freed to spend time in patient teaching and in helping them to make the necessary psychological adjustments to their illnesses and to the hospital.

C. Nurses can give their entire attention to emergency situations, knowing the aide will care for the other patients in the group.

D. Gives nurse and aide more responsibility and incentive as well as opportunity for learning.

E. Satisfies individual needs of personnel, especially for intellectual and technical growth, status, recognition, approval, and a sense of individual value and accomplishment.

F. Less absenteeism.

What are some of problems usually encountered?

A. Obtaining the cooperation of the doctors.

B. Making assignments without sufficient regard for the workers' preparation.

C. Attempting to put team into action by adopting team terminology without first exploring and understanding the basic concept of the team.

D. Planning assignments.

E. Adequate personnel.

F. Personality clashes.

G. Patient objection to care being given by the aide.

Where can further information on the

team be found?

American Journal of Nursing: June, 1950, page 367; August, 1950, pages 498; September, 1950, page 526; July, 1949, page 442.

Nursing Team Organization and Functioning—Eleanor C. Lambertson, Bureau of Publication, Teachers' College, Columbia University, New York, N.Y.

The Citizen-Soldier and National Defense*

By

MAJOR GENERAL BRYAN L. MILBURN, *General Staff, USA*
Special Assistant for Reserve Components

I REALLY welcome the opportunity which your cordial invitation offers me this afternoon. The opportunity is doubly welcome, for it permits me to express not only my profound personal respect for the part reserve officers of our military services have played in the defense of our great country, but to present some thoughts on the over-all reserve problem which I believe merit your earnest consideration. My motive is not to tell you again what you may already know, but to present a view on current matters of mutual interest affecting the citizen soldier and in particular the Army Reserve.

It is indeed a great privilege to talk to such a special audience about a subject so dear to our hearts and which affects every community in our country so intimately. I say special audience because most of you are reserve officers and it is my firm conviction that the Korean emergency and subsequent developments have re-emphasized to the whole country the significance and the importance of our reserve forces. Today, without choice we live in a world of arms. Without choice we live in a state of military preparedness. We, of course, must have a strong active establishment to meet essential

and world wide obligations and commitments, but a strong reserve force of citizen soldiers, trained and ready to be mobilized without delay, must remain the keystone of our national security. This is amply demonstrated by the simple realization that on three different occasions within the life span of many of us we have become acutely aware of the necessity and the value of a trained and ready force to back up our limited regular establishment in time of peril.

I have profound admiration for the incalculable contribution of our citizen soldiers. This admiration is based upon my personal observation of their service in wartime and their response to the Korean operation which required the calling up of more than 200,000 reservists, both in units and as individuals.

We all know how, in our haste to provide the manpower necessary to meet our worldwide commitments in the fight against militant communism, we were forced to rely almost entirely on the veterans of our reserve forces.

It is not generally known or appreciated that even today under a partial mobilization nearly 5 out of every 6 officers in the active Army are reservists. The splendid manner in which our veteran reservists, who were recalled during the last few years, have been able to take their places in our military struc-

* Address delivered at the Fifth Military Medical Dental Symposium, U.S. Naval Hospital, Philadelphia, Pa., October, 22, 1954.

ture affords ample evidence of their self-sacrificing patriotism. In my opinion, the accomplishments of those reservists, steeped in personal sacrifice to a degree seldom known in the history of this nation, will achieve undying stature, and the significance of their noble and patriotic service will forever stand as a glowing symbol for free people everywhere.

But while it is important not to forget the magnificent contribution which these reservists have made, it is even more important to draw a lesson from that contribution. Out of all the confusion, hardship, distress, and grief which the Korean operation occasioned, we should, it seems to me, be clearly and strongly impressed with the need for and the value of the strongest possible reserve that this nation can afford.

It is absolutely necessary as the only alternative to enormous and ruinously expensive military forces-in-being. In fact, we have clearly staked our national security on our ability to mobilize our reserve forces in the face of immediate hostility with sufficient speed not only to repel aggression against us but to pass quickly to an offensive that will keep the devastation of war from our shores, and bring us speedy victory.

Do we today have the reserves—the type of reserves—we need in this time of uneasy peace; reserves in sufficient numbers, so organized and so trained that they could be deployed in accordance with the immediate requirements which we might easily have for them in an emergency? I believe it is generally agreed that we do *not*. In stating this dissatisfaction with our present reserve program, however, I should like to reiterate that this in no sense reflects on the magnificent contribution which individual reservists and many units have made and are now making. We have a good foundation. We need simply to build on it. Our reserve requirements might be expressed in general terms of procurement, organization and training.

Right now the most pressing problem pertaining to the reserves is procurement of

personnel for our reserve units. Obviously we must first have the troops before they can be organized and trained. While the Army National Guard, by a well organized campaign, has been able to reach its limited budget strength, many of its personnel have not had any active service, except possibly two weeks summer camp. The units of the Army reserve, although steady recruiting progress has been made in recent months, are still woefully weak, about 20% of authorized strength. Now what can we do—what *should* we do about this question of procurement for our reserve forces?

Now actually we have thousands of individuals today who have received military training in the active establishment, the majority of them non-combat veterans, who are theoretically available for but who are not participating in the reserve program.

They constitute a “paper” reserve—but certainly not by any stretch of the imagination, the strong, active, immediately available reserve we need. The mere training of additional manpower for short or even extensive periods, without measures to insure that individuals, upon completion of their initial training actually participate in the reserves, so that adequately organized and trained units will be immediately available when needed, leaves the reserve program far short of what we need and must have. A reserve which is not ready when needed is not a reserve; like a spare tire with an undetected leaking tube, it only gives us a false sense of security.

The Selective Service Act of 1948 as amended by Public Law 51, 82nd Congress, effective 19 June 1951, created a category of reservist called the 8-year obligor. This young man has a combined active duty and reserve duty obligation of eight years. In the Army it is generally two years active duty followed by six years reserve duty. In connection with this man, the law specifically says that “in case the Secretary of the Army, Navy, or Air Force determines that enlistment, enrollment, or appointment in or assignment to an organized unit of the reserve

components or officers training program of the Armed Force in which he served is available to and can, without undue hardship, be filled by any such person, it shall be the duty of such person to enlist, enroll, or accept appointment in or accept assignment to such organized unit or officer training program and to serve satisfactorily therein."

Although it is the clear intent of law that individuals who complete a period of active military service will join and participate in the reserves, less than 10% of these obligated reservists are participating. Why? Because there is no effective means of *enforcing* this participation and there is also a strong feeling on the part of many that such participation should *not* be enforced until appropriate measures are taken to bring into the picture the thousands of young men who are escaping any form of military training or obligation. Now, the Army has consistently supported the concept of Universal Military Training (or National Security Training as it is now called) but endorses any plan which will provide military training for a greater percentage of our eligible youth, not only to enlarge the pool of trained manpower which would be available in an emergency, but to relieve veterans, particularly combat veterans, from what has been termed "double jeopardy"; the possibility that those who fought in Europe or the Pacific or in Korea, may in case of another limited emergency such as Korea be required to fight again. This jeopardy cannot be removed unless and until steps are taken to train others who are eligible for but who have received no military training whatsoever.

In the meantime, however (and this problem must be solved regardless of how and how many young men are given military training), we are wasting a tremendous pool of military manpower continuously becoming available which we cannot afford to waste—a pool of only paper reservists except for those who volunteer to participate in the reserve program; and thus far, in spite of intense and continuous efforts on

the part of both the active establishment and the reserve leaders, only a handful have volunteered to participate.

With this reluctance on the part of the obligated reservist to join a reserve unit voluntarily, reserve commanders face an almost impossible task of recruiting. For example, an Infantry battalion commander stated that initially the Chief of his Military District mandatorily assigned 16 reservists to his battalion and that 14 were regularly participating. Then this mandatory assigning procedure had to be discontinued as it was contrary to our policy; so the District Commander simply made available to the battalion commander the names of some 89 individuals with a reserve obligation who had returned to his area. The battalion commander personally contacted all 89 and tried to induce them to join his unit. He was sorry to report that he had sold only 4, notwithstanding the fact that he is a professional salesman by civilian occupation! This is but one of the many similar instances which have come to our attention during extended field visits and from talking with reserve commanders in almost every state of the union. Reserve commanders are almost unanimous in requesting that more positive steps be taken to insure the assignment and participation of these obligated reservists. Remedial legislation is certainly needed. They should be required to participate in reserve training programs to the extent required to maintain their individual readiness and that of their unit for an emergency. It is appreciated, however, that steps should also be taken to the extent practicable to prevent a possible inequity to veterans, particularly combat veterans, to relieve them from the necessity of serving again in a limited emergency such as Korea, by the procurement and training (in some manner) of those who now escape military service. If this whole reserve could then be screened repeatedly for essentiality as to national health, safety, and interest, and personal hardship, to insure that all assigned to the reserves would be actually available in case of

emergency, both the inadequacies and inequities of our reserve program would be eliminated.

Such a reserve program would be able to produce trained individuals and units truly capable of deployment in a relatively short time as cohesive fighting teams. It would meet the full requirements of a sound, strong and equitably constituted reserve; highly trained, without significant attrition, and instantly available.

Presently, in relying so heavily on our reserve structure we are taking a heavy risk, that trained reserves in adequate numbers may not be ready when the country needs them. Therefore, some way, somehow, our reserve program *must* be made to work.

I can think of no element of our reserve forces more important than those requiring the participation of individuals trained in the medical profession. I have heard arguments advanced that if an engineer or doctor or dentist or chemist or minister has had technical or professional education or training, this should suffice; on mobilization he will fit right into the appropriate unit or activity without loss of time or effort. That reasoning is fallacious. We need these professional men now, not only so that they may become better acquainted with and be ready to accomplish promptly the many and varied military requirements for their services, but so that they may train and work with other elements of our military units which depend on them as members of a team, who must be ready to function as a team, on mobilization—not several months *after* mobilization. I fully appreciate the fact that you are busy men; that your normal vocation keeps you working long and irregular hours and denies you the same relaxation and recreation enjoyed by many in other professions. But you are not most appeals for assistance made and successfully made to those who are busiest; who have the best excuse for saying, "I'm sorry but I simply don't have the time."

There is need for additional medical officers and enlisted men for our reserve

forces. There is need for continuation of hard work and self-sacrifice on the part of every member of the medical reserve forces.

But aside from your individual responsibility directly to the reserves, it seems to me that as professional men who enjoy the confidence of the public to an unusual degree, you also have an unusual opportunity to render an invaluable service for national security by explaining the security needs of our nation to your patients and members of your civilian communities in day to day conversations. For example, you might stress that a well organized Naval Reserve and National Guard, Army Reserve or other Armed Forces Reserve unit, is something a community should be proud of and to which it should give strong support. In addition, within your own professional circles you will undoubtedly have an opportunity to create an atmosphere of confidence in medical defense matters amongst the younger doctors and dentists.

Assistance for meeting requirements of reserve units or activities for medical officers should be requested by unit commanders from the Military Affairs Committees of the County Medical Societies. These committees with the backing of the total membership, should assist unit commanders in the procurement not only of physicians and other officers, such as nurses, dentists, veterinarians, Medical Service Corps, but also enlisted men. Medical units of all reserve forces—Navy, Army or Air Force—need this vital push to bring the reluctant and the apathetic into the fold. Without this needed support within the medical profession, there is serious danger that this highly important element of the reserves will wither and ultimately die. Let there be no doubt that the medical profession is a very vital element in national defense. We need your support to carry on.

Our entire reserve program needs this type of support from both within and without the reserve forces. Regardless of regulations and laws and edicts, there will be no effective reserve program unless our peo-

ple as a whole understand and support such a program. If our people do not want it, we will not have it, regardless of its need or merit. After all, whether we have armed forces strong enough to resist the inroads of Communism, or whether we have a strong reserve is really not the basic issue. The basic issue is whether this nation stills holds to these simple profound convictions under which it came into being in this great American City and has lived and gained strength and stature through the years. (Many have expressed these convictions differently and you may prefer to state them in your own way): Do we still believe in the dignity of the individual? That honesty and fair play are essential among friends and strangers alike, and among individuals and nations alike? That there is a Supreme Being, a discerning but just God who looks over us all? That democracy, patriotism and the flag are realistic symbols and ideals, not mere figures of speech or only for oratory or a propaganda line? That an individual has a right to speak his mind freely, worship openly and rise as high as his talents will permit him, subject only to consideration for his neighbors and fellow citizens?

Do we as a nation still nurture and cherish these basic convictions? If so, do we still feel that they are important enough to preserve and defend? Is there not a real danger that we may lose by indifference or apathy what our forefathers gained by sweat and blood? These fundamental ques-

tions must be answered first, and only if we can answer them affirmatively and definitely is any useful purpose served in trying to resolve what seem to be the more pressing issues of whether we should have an adequate military posture, including a strong reserve, whether the individual reservist should participate in the reserve program and, even more important, whether our people as a whole feel he *should* so participate.

Unfortunately, there are many cases today in which reservists are willing and ready to participate in the reserve program but their wives, their mothers, their sweethearts and their employers are bringing pressure on them to stay away from any form of military service. I have an abiding faith, as I'm sure you do, in the American people. I firmly believe that this attitude is based principally on misunderstanding—a misunderstanding of the need and importance of a strong, immediately ready reserve. All of us who know the facts and the implications have a selling job to do. We must convince our people of this fundamental fact: that reserve service, not reserve membership alone, is the only practical alternative to full-time military service on a much larger scale, for much longer periods, and at much greater costs. Unless our people understand this, we will never have the reserve forces we *must* have to deter aggressive acts against us and that we *must* have to achieve peace through preparedness.

AERO MEDICAL ASSOCIATION MEETING
HOTEL STATLER, WASHINGTON, D.C.

MARCH 21-23, 1955

EDITORIALS

Our Heritage to Defend

AS WE approach the birthday of a great American it would be well for us to re-read the words of Abraham Lincoln spoken in 1837:

"In the great journal of things happening under the sun, we, the American people, find our account running under date of the nineteenth century of the Christian era.

"We find ourselves in the peaceful possession of the fairest portion of the earth, as regards extent of territory, fertility of soil, and salubrity of climate.

"We find ourselves under the government of a system of political institutions conducting more essentially to the ends of civil and religious liberty than any of which the history of former times tells us.

"We, when mounting the stage of our existence, found ourselves the legal inheritors of these fundamental blessings.

"We toiled, not in the acquisition or establishment of them: they are a legacy bequeathed us by a once hardy, brave, and patriotic, but now lamented and departed race of ancestors.

"Theirs was the task (and nobly they performed it) to possess themselves, and through themselves, us, of this goodly land, and to uprear upon its hills and valleys a political edifice of liberty and equal rights; 't is ours only to transmit these—the former unprofaned by the foot of an invader; the latter undecoyed by the lapse of time and untorn by usurpation, to the latest generation that fate shall permit the world to know.

"This task, gratitude to our fathers, justice to ourselves, duty to posterity—all imperatively require us faithfully to perform.

"How, then, shall we perform it? At what point shall we expect the approach of dan-

ger? Shall we expect some trans-atlantic military giant to step the ocean and crush us at a blow?

"Never! All the armies of Europe, Asia, and Africa combined, with all the treasure of the earth (our own excepted) in their military chest, with a Bonaparte for a commander, could not, by force, take a drink from the Ohio, or make a track on the Blue Ridge, in a trial of a thousand years.

"At what point, then, is the approach of danger to be expected? Answer: if it ever reaches us, it must spring up among us.

"It cannot come from abroad. If destruction be our lot, we must ourselves be its author and finisher. As a nation of freemen, we must live through all time, or die by suicide."

Enemies from without are today threatening our way of life, our religious freedom, our individual constructive thinking. Shall we hold these valuable inheritances or shall we lose them to those from without by insidious actions from within? It is for America to take more positive steps to teach the oncoming generations of their obligations to their God, their country, and their home. A spirit of nationalism, void of selfishness and arrogance, may well be our aim in order to leave this great legacy, undefiled, to posterity.

Opportunity and Philanthropy

THE acquisition of great wealth by a single individual is a phenomenon almost peculiarly American, and not impossible of accomplishment (except perhaps in the case of members of the medical profession) even in these days of extreme taxation. A case in point is the subject of a

newly published biography, *Hugh Roy Cullen*, of the state of Texas, which, as everyone knows, produces only the biggest and best of any named commodity, including millionaires and philanthropists.

There is a variation in the philanthropies of this particular titan which sets him apart, and above, his fellows. Most men of wealth have guarded their treasure jealously during their own lifetime, as though to part with sizeable segments of their millions would lower their standing among their brother moguls. In breaking this tradition, Hugh Cullen has given flesh to the dreams which we have all voiced at one time or another in words which begin "Now, if I was a millionaire, I would . . .". His altruism has included million-dollar trust funds for four hospitals sponsored by as many creeds,

a college for negroes, and the fabulous University of Houston. Perhaps the well merited publicity which attends announcements of his largess has helped to emphasize to our young people that America is still a land of opportunity. As the Hon. Joe Martin of the House of Representatives commented: "The story of Hugh Roy Cullen should be required reading for any pessimists who believe that America is a nation of vanishing horizons. . . . As long as our country produces men of the character of Roy Cullen, it will go forward." To these words we say "Amen," and echo his biographers, in wishing Roy Cullen, who evoked them, continued vigor to pursue his goal of helping to make this world a better place for all men.



In a paper to Alexander Hamilton, George Washington under the title "Sentiments on a Peace Establishment" said:

"It may be laid down as a primary position, and the basis of our system, that every citizen that enjoys the protection of a free government, owes not only a proportion of his property but even of his personal services to the defense of it, and consequently that the citizens of America (with a few legal and official exceptions) from 18 to 50 years of age should be born on the Militia Rolls, provided with uniform, arms, and so far accustomed to the use of them that the total strength of the country might be called forth at a short notice on any very interesting emergency."

Around the World

By

CLAUDIUS F. MAYER, M.D.

HAITI had been one of the countries where yaws (framboesia) used to spread without control so that one third (or more) of its population of a little over three millions was scourged by the disease. The Government requested international help in 1949, and launched a major campaign in July 1950 to *eradicate yaws* from the Republic through the use of *one-shot penicillin injections*. According to current estimates, over two and one half million Haitians were thus treated, with the result that in certain regions of Haiti the disease is now practically wiped out while in the rest of the country the ultimate goal is about to be reached.

Penicillin therapy to be a tremendous success for another treponemal disease. Last year, ten years after the introduction of this therapy (in 1944), a large-scale survey was carried out in 55 countries to learn the effectiveness of the new *antibiotic against syphilis* and its influence upon the classical forms of antiluetic chemotherapy by metals (Bi, As, Hg). For the treatment of the disease, penicillin is used (a) alone in 63.3% of the surveyed clinics, (b) in combination with adjuvants in 28.9% of them, while only 5.8% of the questioned institutions is still adhering to the exclusive chemotherapy by metals. The cost of a single shot of penicillin, the cure-all for early cases, moves between 93 cents and \$1.50:—a huge saving, since there are around 20 million syphilitics in the world. Fortunately, the time is still far away, however, when swallowing a penicillin tablet will be all the precaution recommended for care-free promiscuous relations.

Taking the syphilogram of the world brings us to another current venture for the eradication of venereal diseases. It is the *Rotterdam Port Demonstration Center*. Inaugurated in 1951, this center is con-

cerned with all aspects of the *venereal problem among seafarers*, medical, administrative, social and psychological. Time by time it organizes international courses for specialists of all countries. The Director of the Center recently cautioned that, in spite of the wonders of penicillin, VD cases are still very frequent among sailors who, since the 1924 Bruxelles Agreement, are supposed to have in every port—in addition to their traditional sweethearts—easily accessible clinical facilities against VD. Venereal diseases will remain a threat to the sailor as long as bar and brothel are the only institutions of culture in foreign countries where he is willingly accepted as a normal human being, and will not feel out of place.

The Kingdom of *Nepal* requested assistance to strengthen its *health services*. Control of malaria and other insect-borne diseases, fight against tuberculosis, and training of multi-purpose Nepalese nurses are the main problems. In that country, malaria is responsible for 80,000 deaths a year while the annual number of sufferers of malarial fevers is over three and one half million (Total population of Nepal: ca 6½ million).

For several years *Burma* has been also instructed by teams of WHO workers in the technic of *fighting malaria*. The reports tell that the disease is now in retreat in certain provinces (e.g., around Lashio). While formerly about 90% of the young children were found with enlarged spleens (:the best malarimetric index), now only in 12% is the spleen out of its normal dimensions. The chief Burmese vector of malaria is the *Anopheles minimus*.

Another Asian country of public interest is Ceylon. Though its health conditions are improving, *Ceylon is still in need* of trained people, schools, and many other things. Its Ministry of Health desires to establish an

additional (third) small nursing school in Colombo in order to relieve the shortage in nurses among the Singhalese. Another school, now active in Kandy, is scheduled for a transfer to Colombo. Further plans call for extension of mental health work and for enlargement of the staff of the Angoda Fever Hospital.

Ceylon has a long history as a monarchy since 543 B.C. It ceded to Britain in 1815, but it obtained a Dominion status in 1949. It has an Army whose medical unit originated in 1881 as the Bearer Company: in 1910 the unit became the independent Ceylon Volunteer Medical Corps, to be reorganized in 1949 as the *Ceylon Army Medical Corps* (C.A.M.C.) The organization has a Services Hospital at Galle Face, Colombo, where medical soldiers are trained, and a Medical Reception Hospital at Diyatalawa, the highland town where recruits receive their 3-month basic training. Higher ranks for the C.A.M.C. are trained in Great Britain. Service in the regular Army is for 5 years, with 7 additional years in the reserves.

Another *Army Medical Corps* of still younger life is now functioning in *Luxembourg*. During the latest International Congress of Military Medicine, held in that Duchy, the existence of the tiny Army and its well-organized medical service were revealed. The Luxembourg Army was born on paper in November 1944. Its manpower is derived from universal conscription. Its medical organization is growing, together with the Army, since July 1945 when the first battalions were recruited. The medical service provides 40 hospital beds for each 1000 troops, and it built a model hospital to the Walferdange Barracks where the Guard Corps of the Grand-Duchess is quartered, together with different auxiliary services of the Army. The surgical needs of the service are still to be provided by civilian hospitals. A well-equipped dental section, a well-stocked pharmaceutical depot, ambulance cars and other mobile units (one for each: surgery, dentistry, and supply) are at the disposal of the Luxembourg

Army Medical Corps whose personnel is composed of regular military surgeons and commissioned civilian doctors.

The "surgeon-general" of this service has the rank of a major (Dr. P. Felten). As Chairman of the International Medico-Military Congress, he had a chance to hold up to the world small Luxembourg as an *exemplary promoter of humanitarianism* in wartime. We recall that the pre-World-War-II meetings of a special Committee that first urged the protection of civilian population in war (and thus prepared the 4th Geneva Convention of 1949) were held in Luxembourg.

In the late experience of the *Belgian Air Force* Medical Service, the *special fuels* (J₁, J₃, J₄) used in the F-84 Thunderjets and Meteors are apt to cause not only acute and chronic poisoning by gasoline vapors but also different kinds of *dermatosis* in sensitive people. Various skin lesions (redness, blebs, wheals, eczema) were frequently observed in air-force personnel admitted to a Bruxelles military hospital.

The *French Academy of Medicine* wishes to know which is the most propitious time of an infant's life to inoculate him against smallpox. A commission was appointed to study the problem, which became acute since nowadays a doctor has to decide *which vaccine has prior claim for a baby*: the cowpox virus or the BCG. Someone demanded that all babies should be vaccinated with BCG during the first month of their young lives. The outcome in this battle of vaccines is not yet known.

Many devices had been suggested in the past for the *aid of the blind*. Electrosensorial radar machines—sort of seeing-eye dogs—were proposed to replace the sense of vision (a) by the sense of touch (a tingling on the forehead, for instance), or (b) by the sense of hearing (Erismann). The most spectacular and controversial suggestion came from Austria (Dr. Gartlgruber). It concerns the construction of an "*electronic eye*," a miniature television camera connected to the brain centers of vision. The

possibility of such a device is supported by the electromagnetic vibration theory of human vision which teaches that the eye is a receptor only, and that the retinal electric currents are made into images in the brain. Though related experiments had been carried out for many years at the Ophthalmological Clinic of Wien, the device of the Austrian naturalist received current interest owing to the new possibilities of our atomic age.

Here is a demand for further clinical trial of *insulin* (di-insulin) *aerosol*, the method so successfully used by a Madras doctor in the experimental treatment of his private diabetic patient. The mode of inhalation resembles a technic which had been known from ancient Hindu texts as the *Pranayama technic of inhalation*. This attempt seems to be the first at administering insulin in this form. The patient, who needed 24 units of the hormone as daily maintenance dose, had sugar-free urine during the day of experiment.

It was recently announced that *cerebral palsy is less common* among American Indians and Negroes born in the U. S. South than among other people of our country. It happens that the women of only these two ethnic groups are still in the *habit of sitting or squatting during the birth* of their babies.

The Eighth *British Pharmacopoeia* (B. P. 1953), which became official on Sept. 1, 1953, now favors the English names of drugs and English forms of prescriptions. Well! As a Hindu pharmacologist justly cautioned recently, those who like their drugs written in the vernacular should give a thought or two to the fact that *Latin provides* a more definite and unchanging form to the doctor's order, not to mention its extra value as a *dose of psychotherapy* and a mystic flavor of the formula. Could ever "Castor Oil" and "Water" have such an awe-inspiring psychosomatic effect on the patient as "*Ol. ric.*" (:Oleum ricini) and "*Aq.*" (:Aqua) ??? . . . *Multa paucis!*



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ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3d of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON.

FRANK B. BERRY, M.D.

Executive Ass't—COL. SHELDON S. BROWNTON, USAF (MC)

RESIDENCY DEFERMENT OF PHYSICIANS

Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical) announced that 300 draft-eligible physicians were selected for consideration by the Selective Service System for deferment for one-year residency hospital training. They were selected from 1300 young doctors who desired deferment and special training.

The 300 interns will be trained in 15 medical specialties that are essential to the military services. The training program, which is known as the Armed Forces Reserve Medical Officer Commissioning and Residency Training Program, has the purpose to obtain better trained qualified physicians, one hundred for each of the three military departments.

PHYSICIAN AND DENTIST CALL

During April 1,275 physicians and 459 dentists will be called into service by the Selective Service System. This is the requirement set by the Department of Defense for the last quarter of the Fiscal Year 1955. The Physician requirement is 825 for

the Army, 200 for the Navy, and 250 for the Air Force. The dentist requirement is 309 for the Army and 150 for the Air Force. Men with No. 1 and No. 2 priorities are not sufficient to reach this quota. Consequently draft boards have started processing priority-3 physicians up to the age of 37, and dentists up to the age of 44.

ADA OPPOSES SPECIAL DRAFT LAW

The American Dental Association is opposing the extension of any special draft law for dentists, unless "international tensions require a material increase in military personnel."

The delegates of the ADA also approved a report which stated that an adequate dental care program for military personnel could be maintained from the ranks of dental school graduates with basic Selective Service liability."

ARMED FORCES STRENGTH

Secretary of Defense Charles E. Wilson announced that, according to a recent decision on reduction, the successive strength of the Armed Forces will be as follows:

By June 30, 1955: Army, 1,100,000; Navy, 665,000; Marine Corps, 205,000; Air Force, 970,000.

By June 30, 1956: Army, 1,000,000; Navy, 650,000; Marine Corps, 190,000; Air Force, 975,000.

The Secretary also announced that the size of the active Army is subject to continuous review. Basically, it is determined by the present world-wide commitments of the U. S. and by the desire to have adequate force to sustain the first shock in case of hostilities.

Such a flexible policy demands, however, that the Reserve Forces of the country be



LADIES LUNCHEON AND FASHION SHOW, NOVEMBER 30, 1954—61ST ANNUAL CONVENTION—ASSOCIATION MILITARY SURGEONS.

strengthened. A new National Reserve Plan has been worked out as a supplementary measure for strengthening the defense and security of the country.

SELECTIVE SERVICE CALLS 11,000 FOR ARMY DURING FEBRUARY

The Department of Defense has requested the Selective Service System to provide 11,000 men during February for assignment to the Army.

The number of men requested by the Army represents a downward revision from the original February request for 20,000 men. This revision results from the planned reduction in the approved strength of the Army, and is based on reaching this lower strength after allowances have been made for enlistments and reenlistments.

NEW PRESIDENT FOR SOCIETY OF MEDICAL CONSULTANTS

Dr. Worth B. Daniels of Washington, D.C., was elected as president of the Society of Medical Consultants to the Armed Forces at a recent meeting held at the Walter Reed Army Medical Center.

PSYCHONEUROTICS

In World War II almost two million men were labeled "psychoneurotic," thus making them unfit for military service. The reasons for this situation have been studied by the Conservation of Human Resources Project of Columbia University, New York City.

This project, which since 1949 has made valuable contributions to the policies of the National Manpower Council, reviewed the records and the life histories of many in-

effective soldiers, and also attempted to determine what role the environmental factors play in a man's performance.

It is hoped that such studies will influence the present organizational policies so that greater effectiveness of the military group and better use of our human resources will follow.

REPATRIATED SOLDIERS

Twenty-five of our soldiers who were released from Communist captivity in Korea are still hospitalized. Fifteen of these have tuberculosis.

At the time of their repatriation, many prisoners were underfed, and more than a third of them suffered frostbite during captivity.

The Geneva Convention of 1929 includes provisions for proper feeding of military prisoners of war. It also prohibits forced labor and inhumane treatment of such prisoners.

Army

Surgeon General—MAJ. GEN. GEORGE E. ARMSTRONG

Deputy Surg. Gen.—MAJ. GEN. SILAS B. HAYS

"PASS-OVER" SEPARATION PLAN

On January 1 the Army started implementation of its new policy providing for separation from the Active Army those officers, both Regular Army and Reserve, who twice fail to be selected for temporary promotion to the grades of captain, major, or lieutenant colonel.

Reserve officers affected by the "pass-over" will be relieved from active duty after a 120-day notice. In cases where the promotion board finds an officer is below acceptable standards for the Army Reserve, the officer's Reserve commission will be terminated as well.

The new policy does not affect existing policies which provide for the separation of officers passed over for permanent promo-

tion in the Regular Army or the Army Reserve.

It is to be noted that temporary promotions to the grade of colonel do not come under the provisions of the policy governing pass-overs for temporary promotion to the grades of captain, major and lieutenant colonel. Officers are selected for temporary promotion to colonel on a "best qualified" basis; temporary promotions to the other three grades are on a "fully qualified basis."

It has also been announced that implementation of the Army's indefinite active duty term agreements program was to be effected early in 1955.

NEW TRAINING CENTERS FOR ARMY RESERVE

There will be built several new training centers for the U. S. Army Reserve in ten states. The centers will be school-type buildings for the training of 200 or 400 reservists. This will raise the total number of such centers to 139. Construction will start within three to six months after the acquisition of suitable sites in the following states and at the following locations:

1) Connecticut: Waterbury; 2) Georgia: Athens; Rome; 3) Indiana: Evansville; 4) Massachusetts: Pittsfield; 5) Michigan: Flint; 6) Missouri: Joplin; 7) Ohio: Mansfield; 8) Pennsylvania: Greensburg; Lancaster; Uniontown; Washington; 9) South Carolina: Rock Hill; 10) Texas: Huntsville.

SGO ASSIGNMENT

Brig. General Mack M. Green, XVI Corps Surgeon, has returned from an assignment in Japan for duty in the Office of the Surgeon General.

CHAIRMAN, ENTOMOLOGICAL SOCIETY

Lt. Colonel Ralph W. Bunn, MSC, Chief Entomological Section, Surgeon General's Office, has been elected chairman of the Medical and Veterinary Entomological Section of the Entomological Society of America.

This Society is comprised of six sections

with each one concerned with a different facet of entomology.

Colonel Bunn holds an A.B. degree from the University of Kansas and a Master of Public Health degree from the University of California. He is a member of the American Mosquito Control Association.

CHIEF, ARMY AVIATION SECTION, SGO

Lt. Colonel Spurgeon H. Neel, MC, has been assigned as Chief of the Army Aviation Section in the Office of the Surgeon General.

Colonel Neel recently came from Korea where he spent 14 months as Group Commander of the 30th Medical Group. He is a graduate of the Medical Field Service School, Carlisle, Pa., the School of Aviation Medicine, the Basic Airborne Course, Ft. Benning, Ga., and the Command and General Staff College, Ft. Leavenworth, Kansas.

FORMER MEDICAL DEAN IN SGO

Captain Verner J. Johns, MC, formerly Associate Dean of the School of Medicine, College of Medical Evangelists has been assigned to duty in the Professional Training Branch, Education and Training Division, of the Surgeon General's Office.

He was ordered to active duty in October, his first station being Fort Sam Houston, Texas, where he was given an orientation course.

Captain Johns has been certified by the American Board of Internal Medicine.

ADA PRIZE AWARD

The Army Dental Corps won first prize award for the best exhibit by a Federal agency at the 1954 annual convention of the American Dental Association. The exhibit was entitled "Research on the Care of the Tooth."

The dental officers responsible for the award-winning display included Col. Joseph L. Bernier, Chief, Oral and Dental Pathology Branch, Armed Forces Institute of Pathology; Lt. Col. Russell Sumnicht, and Lt. Col. George W. Burnett, both of the

Walter Reed Army Medical Center; and Maj. Peter Margetis, of the Military District of Washington Student Detachment, stationed at the National Bureau of Standards.

Construction of the exhibit was done by the Medical Illustration Service of the Armed Forces Institute of Pathology.

DENTAL OFFICER TO SGO

Colonel Henry R. Sydenham, DC, has been assigned to the Office of the Surgeon General as Chief of the Dental Service Branch. He replaces Colonel C. T. Budge who has been assigned to the Presidio of San Francisco.

Prior to his assignment in the Office of the Surgeon General Colonel Sydenham was Third Army Dental Surgeon. This latter position has been filled by Colonel Dean S. Beiter, D.C.

AWARDED "A" PREFIX IN DC

Colonel Jack Caldwell, Chief, Oral Surgery, Letterman Army Hospital, and Colonel H. Beecher Dierdorff, Chief, Dental Service, Fitzsimons Army Hospital, both oral surgery specialists, have been awarded the "A" prefix to their occupational specialty number.

This brings the number of Army dental officers with the prefix "A" to five, although among them they hold six such ratings. Colonel Joseph L. Bernier, Chief, Oral and Dental Pathology, Armed Forces Institute of Pathology holds an "A" rating for oral pathology and another for peridontia.

The "A" rating is presented for outstanding qualifications in the chosen specialty of the officer with certification by his respective American Specialty Board being a requisite.

DENTAL MEETING

The mid-winter meeting of the Chicago Dental Society will be held at the Conrad-Hilton Hotel, February 6-9.

Major General Oscar P. Snyder, Chief of the Army Dental Corps will represent the

Surgeon General's Office. On February 10 he will discuss the administrative procedures of the Army Dental Corps before the Veterans Administration Dental Training Center in Chicago.

ARMY NURSE CORPS

The Army Nurse Corps celebrated its 53rd Anniversary on February 2. This Corps became an integral part of the Army Medical Service, at that time known as the Army Medical Department, by an Act of Congress of February 2, 1901. However, the Nurse Corps had existed since 1899, although there was no special authorization until the 1901 date.

The present strength of the Army Nurse Corps is: Regular 1299, Reserve 2647 (Total-3946).

RESIDENTS GRADUATE AT WRAMC

Major General Leonard D. Heaton, Commanding General of the Walter Reed Army Medical Center recently presented certificates of graduation to the following officers who completed their residency training: Colonels Thomas H. Hewlett and Doss O. Lynn; Lt. Colonels Robert Bernstein, David L. Deutsch, William A. Moore, and Paul E. Sieber; Majors Harold G. Carstensen, Jack B. Jay, Ray L. Miller, Jack L. Roth, and William A. Williams.

AWARDED "A" PREFIX IN MSC

Lt. Colonel Joseph H. Akeroyd, MSC, assistant chief of the Department of Hematology at the Army Medical Service Graduate School, Walter Reed Army Medical Center, has been awarded the "A" prefix to his Military Occupational Specialty number.

This honor is given for outstanding qualifications and teaching proficiency. The special field of Colonel Akeroyd is hematology. He has done outstanding work in the area of blood transfusions, blood groupings, and blood disease.

ASS'T CHIEF, ORTHOPEDICS, BECOMES COLONEL

The assistant chief of Walter Reed Army Hospital's Orthopedic Service, Sterling J. Ritchey, has been elevated to the rank of colonel.

Colonel Ritchey is a member of the American Medical Association, the American Academy of Orthopedic Surgeons, and a Diplomate of the American Board of Orthopedic Surgery.

MFSS CELEBRATES ANNIVERSARY

The Medical Field Service School, a component of the Brooke Army Medical Center at Fort Sam Houston, Texas, celebrated its eighth anniversary at that station on January 14th.

Five permanent-type buildings were named for Medical Service Officers whose contributions to Army medical and medical service fields have surpassed the usual duty requirements, according to the commandant, Brig. General James P. Cooney.

The Medical Field Service School was activated in July 1920 at Carlisle Barracks, Pa., and moved to Fort Sam Houston in January 1947. The school trains both officers and enlisted personnel for the many activities of the Army Medical Service.

MEDICAL DEPOT ACTIVATED

The 32nd Army Medical Depot has been reactivated at Brooke Army Medical Center, Fort Sam Houston, Texas. The 32nd was awarded battle honors for its part in the Normandy, Northern France, Central Europe, Germany, Ardennes, and Rhineland Campaigns. Following World War II, the unit was inactivated at Camp Bowie, Texas, in 1945.

The 32nd replaces the 321st Medical Depot which will be inactivated and allocated as a Michigan Reserve Unit.

Major Clyde M. Fowler, present commander of the 321st will command the 32nd Army Medical Depot, which is the only unit of its type in the United States, since it is a combat-type unit.



INTERNATIONAL GROUP AT WHICH FOREIGN DELEGATES WERE GIVEN HONORARY MEMBERSHIP
IN THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES
61ST ANNUAL CONVENTION, WASHINGTON, D.C.
NOVEMBER 29-DECEMBER 1, 1954

SAFE DRIVING RECORD

A record to be proud of has been announced by Brig. General J. P. Cooney, Commandant of the Medical Field Service School, Fort Sam Houston, Texas.

Since August 1952 hundreds of thousands of miles have been driven by the students, numbering more than 25,000. No traffic fatality has occurred.

A major factor contributing to this record is the emphasis placed on driving safety. Distance allowed for week-end travel is limited. Personnel going on leave are cautioned about driving when sleepy or tired.

MADIGAN TO HAVE NEW CG

Brig. General Paul I. Robinson, Eighth Army Surgeon, Korea, will return to the States in February and be assigned to Madigan Army Hospital, Tacoma, Washington.

The present Commanding General, Brig. Gen. Emery E. Alling will retire in April.

COMMANDS 54TH MED. GROUP

Colonel Frederic B. Westervelt, MC, who has just returned from a tour of duty in Japan, has been designated as the Commanding Officer of the 54th Medical Group at Fort Benning, Georgia. The 54th Medical

Group, formerly the 54th Medical Battalion, replaced the Provisional Medical as of January 1.

THANKS TO VOLUNTEERS

There is a large group of nameless volunteers who contributed to the modern progress of the Army medical research by offering themselves as subjects in clinical and laboratory experiments.

Earlier, the soldiers themselves volunteered as human guinea-pigs. During the last decade, prisoners in penal institutions participated in the medical tests of the Armed Forces.

Among their achievements as test objects the most outstanding were in the screening of antimalarial drugs, in the study of the various types of viral hepatitis, in testing vaccines against influenza, and in determining the toxic effects of several tick- and mite-repellents on the organism.

To these human volunteers, nameless though they be, we all owe a debt of gratitude.

QUARTERMASTER RESEARCH CENTER

On October 14, 1954 the Army Quartermaster Research Center at Natick, Mass., was opened. One of the outstanding features

was the Climatic Research Building. The Center will be able to study the performance of human beings, as well as that of military equipment, under simulated weather conditions, ranging from 70° below zero to 168° above zero; from tropical cloudbursts to Arctic snowstorms, with winds up to 40 miles an hour. Here, everything can be tested, including items from footwear to bakery equipment, and from insecticides to tentage.

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN



Navy Photo

REAR ADM. BARTHOLOMEW W. HOGAN, MC, USN

THE NEW SURGEON GENERAL

Rear Admiral Bartholomew W. Hogan, MC, U. S. Navy, was nominated by President Eisenhower to be the twenty-second Surgeon General, and the twenty-sixth Chief of the Bureau of Medicine and Surgery. He is the third Deputy Surgeon General to be appointed from that position to Surgeon Generalcy.

Admiral Hogan was born in West Quincy,

Mass., on January 29, 1901. While in medical school he was enlisted in the 26th Air Division, Massachusetts National Guard. Upon graduation in June 1925 from Tufts College Medical School, Boston, where he received the Phi Lambda Kappa Medal for highest achievement, Admiral Hogan was appointed a Lieutenant (jg) in the Medical Corps of the Navy. He was appointed Rear Admiral to rank from April 1, 1952, and became Deputy Surgeon General on April 30, 1954.

In March 1942 Admiral Hogan reported as Senior Medical Officer on the USS *Wasp* and was aboard that carrier when she was torpedoed in the South Pacific on September 15, 1942. For heroic service during this action he was awarded the Silver Star Medal and later the Navy and Marine Corps Medal while on board the destroyer, USS *Duncan*, which rescued personnel of the USS *Wasp*.

Admiral Hogan is a Fellow of the American Medical Association; American College of Physicians; American Psychiatric Association; a Diplomate of the American Board of Psychiatry and Neurology; a member of the American College of Hospital Administrators; a member of the House of Delegates of the American Medical Association; a member of the House of Delegates of the American Hospital Association; and an Associate Professor of Psychiatry, Georgetown University School of Medicine. In 1945 he received the Honorary Degree of LL.D. from Mt. Saint Mary's College, and in 1954 a like degree from Villanova College. He has written a number of professional papers, and was Editor-in-Chief of the Hospital Corps Handbook, 1953 Edition.

MEDICAL MILITARY TRAINING PROGRAM

The Naval Medical School, National Naval Medical Center, Bethesda, Maryland will conduct the fifth two-weeks course in Medical Military Training for the primary benefit of reserve officers of the Medical Departments of the Armed Forces on inactive duty, March 7-19, 1955.

Naval Reserve Medical, Dental, Medical

Service, Nurse, and Hospital Corps officers should submit their requests to their commandants for appropriate active duty for training orders at the earliest practicable date. Officers of these corps attached to pay units of the Naval Air Reserve should submit their requests to the Chief, Naval Air Reserve Training. A quota providing for attendance at this course in a pay status has been assigned each of these commands.

Reserve Medical Department officers on inactive duty who have not attended this course during the past year are urged to avail themselves of this excellent training.

RETIREES AS REAR ADMIRAL

Captain Clarence Lloyd Blew, Medical Corps, USN, was transferred to inactive duty on the Temporary Disability Retired List of the Navy effective December 1, 1954. He was retired with the rank of Rear Admiral, MC, USN.

Admiral Blew entered the Navy as a Lieutenant, junior grade, Medical Corps, in June 1929. He had previously served, during World War I, with the Marines in France and was the recipient of the Purple Heart Medal for wounds sustained in action on October 9, 1918.

Born in Larned, Kansas, on April 5, 1898, Admiral Blew received his Bachelor of Science degree from Kansas University in 1921, and the degree of Doctor of Medicine from the same school in 1925.

He was awarded the Bronze Star Medal with Combat "V" for meritorious achievement as Senior Medical Officer of the USS *Enterprise* during operations against enemy Japanese forces in the Pacific Ocean Area from June 12, 1943 to November 20, 1944.

RETIRED AFTER 23 YEARS NAVAL SERVICE

Captain Thomas William Mc Daniel, Jr., Medical Corps, USN, was placed on the Retired List of Officers of the Navy on December 1, 1954.

Born in Boughton, Arkansas, November 3, 1905, Captain Mc Daniel received his Bachelor of Arts degree from Ouchita Bap-

tist College in 1925; his Master of Science degree from Little Rock College, Little Rock, Arkansas; and the degree of Doctor of Medicine from the University of Arkansas School of Medicine in 1931.

Captain Mc Daniel is a member of the American Medical Association and the American Psychiatric Association; and a Diplomate of the American Board of Psychiatry and Neurology. His address in retirement is 313 Rivercrest Drive, Fort Worth, Texas.

NURSE CORPS OFFICER RETIRES

Lt. Commander Carol Pfeiffer, Nurse Corps, USN, was transferred to inactive duty on the Temporary Disability Retired List of the Navy on December 1, 1954.

A native of Hartford, New Jersey, LCdr Pfeiffer graduated from the Pennsylvania Hospital School of Nursing, Philadelphia, in 1931. She entered the Navy in 1934, and received the degree of Bachelor of Science in Nursing Education from Catholic University, Washington, D.C., in 1952.

LCdr Pfeiffer's current address is 216 East Shore Drive, Massapequa, Long Island, New York.

RETIREMENTS

Recent retirement of USN Officers of the Medical Service are:

Cdr Joseph Henry Scanlon, DC, USN.

LCdr Francis Neal Johnston, DC, USN.

Lt. Shirley Ann Dobbs, NC, USN.

Lt. Catherine Ella Harvey, NC, USN.

CO—BROOKLYN DENTAL CLINIC

Captain Francis W. Lepeska, DC, has been appointed as Commanding Officer of the Naval Dental Clinic, Brooklyn, New York. He relieved Captain Eric B. Hoag who has been appointed as District Dental Officer, Seattle, Wash.

ENTOMOLOGY COURSE TO EGYPTIANS

The Naval Medical Research Unit at Cairo, Egypt, recently completed courses of

SPEAKERS' TABLE—HONORS NIGHT BANQUET



Left to right—Dr. DANIEL LYNCH, Mrs. DANIEL SHAW, Mr. JOHN DAVENPORT, Mrs. THOMAS WINN, Mr. HOWARD FONDA, Mrs. DAN OGLE, RADM. W. P. DANA.



Left to right—Mrs. GEORGE E. ARMSTRONG, MAJ. GEN. HOWARD SNYDER, Mrs. JOEL T. BOONE, Mr. H. V. HIGLEY, Mrs. (Dr.) I. S. RAVDIN, Dr. FRANK B. BERRY (Speaker).

61ST ANNUAL CONVENTION—DECEMBER 1, 1954



Left to right—DR. LEONARD SCHEELE (*Pres.*), DR. I. S. RAVDIN (*Speaker*), MRS. LEONARD SCHEELE, VICE ADM. JOEL T. BOONE, MRS. H. V. HIGLEY, MAJ. GEN. GEORGE E. ARMSTRONG.



Left to right—MRS. HOWARD SNYDER, MAJ. GEN. DAN OGLE, MRS. W. P. DANA, DR. JOS. LAWRENCE, MRS. JOHN DAVENPORT, MR. THOMAS WINN, DR. DANIEL SHAW.

instruction in Entomology to two groups of Egyptian insect control supervisors. The course was designed and given by Cdr. John D. Decoursey, Cdr. H. S. Hurlbut and Abdel Aziz Salah who are members of the scientific staff of the Unit.

Emphasis was placed on insect borne diseases and on rodent control.

AWARDED M.S. DEGREE

Through his four years intensive work on the problems of snail control in relation to the control of bilharzia (schistosomiasis) Rizkalla Zakhary, a member of the scientific staff of the U. S. Naval Medical Research Unit No. 3, Cairo, Egypt, has been awarded the Master of Science degree.

His studies included many detailed observations of the effect of various chemicals on the disease-bearing snails and the factors that influenced the effectiveness of these chemicals.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. W. H. POWELL, JR.

632 MILES PER HOUR SLED RUN

Lt. Colonel John P. Stapp, Chief of the Aero-Medical Field Laboratory at Holloman Air Development Center, New Mexico, reached a speed of 632 miles per hour while riding a rocket-propelled sled to reproduce exposure to windblast and slowdown effects experienced by aircrewmembers when escaping from aircraft at supersonic speeds.

The test vehicle was a 2000 pound sled mounted on rails and pushed by nine rockets. The enormous force generated by the rockets accelerated the sled from a standing start to its top speed of 632 miles per hour in five seconds time and 2800 feet distance. After the rockets burned out the sled coasted for less than a half second and the actual braking to a stop took a fraction more than a second. During the test, Colonel Stapp withstood a deceleration of 35 times gravity

and a wind pressure of more than two tons. With the exception of a plastic helmet and a clear plastic visor to protect his face no special clothing was worn for the test.

The sled was stripped even of a wind shield for the test. The subject was strapped to his seat with a special nylon web harness made of individual strips of nylon comprising shoulder and leg straps, chest and lap belt and tie down straps.

At the 4100 foot altitude of Holloman Air Development Center, the wind force against Colonel Stapp's body when he reached the speed of 632 miles per hour was equivalent to that of almost 1.7 times the speed of sound (more than 1,000 miles per hour) at 35,000 feet, the normal cruising altitude of jet aircraft.

Although he did not suffer any ill effect from the test, Colonel Stapp received small blood blisters from dust particles in the air and two black eyes as a result of his eyes being thrown forward against his eyelids during the rapid deceleration period.

MANAGEMENT OFFICES IN HOSPITALS

Efforts of the Air Force Medical Service to improve the management of the Air Force hospitals along the main principles of Public Law 429, 81st Congress, 1949, resulted in the establishment of pilot management offices at Parks and Lackland Air Force Bases.

The operation of the two test offices was just completed in January 1955, and the results are now being studied whether they justify the introduction of management offices in all Air Force hospitals.

The Air Force Medical Service feels that the program is certainly justified, even if a management-conscious attitude in supervisory personnel is the only benefit to be derived from the project.

Public Health Service

Surgeon General—LEONARD A. SCHEELE, M.D.
Deputy Surg. Gen.—W. PALMER DEERING, M.D.

DIVISION OF SPECIAL SERVICES

A new division has been added to the Bureau of State Services, which completes the recently initiated reorganization of that part of the USPHS.

The new unit, called Division of Special Services, is a consolidation of three former units (chronic disease, VD control, and occupational health) under a single head. It is responsible for the bureau's programs directed toward specific health problems or specific groups of people; it will also aid the states in putting speedily to work the results of research for control of disease and conservation of health. The new division is directed by Dr. Seward E. Miller.

FEDERAL PROGRAMS CO-ORDINATOR

Appointment of Nelson A. Rockefeller as special assistant to President Eisenhower, in charge of co-ordinating all Federal programs to develop "increased understanding and cooperation among all peoples" was announced on December 16, 1954.

Mr. Rockefeller relinquishes his job as Undersecretary of Health, Education, and Welfare, a post he has held since June 1953.

STATUS AND PRIVILEGES RESOLUTION

Delegates of the Association of State and Territorial Health Officers passed a resolution at their recent annual meeting in Washington which strongly recommends that Congress should give the officers of the Public Health Service the same status and privileges, including veterans rights, now available to members of the Armed Forces.

POPULATION

The death rate for the year 1954 was expected to close at 9.2 deaths per 1,000 population, a substantial drop from the rates of 9.6 or 9.7 which have prevailed over the past five years. The absence of any reported outbreak of influenza in 1954, with consequent low death rates for the chronic cardiovascular diseases, was cited by Dr. Leonard A. Scheele, Surgeon General, as a principal

reason for the decline. Infant and maternal deaths were also expected to hit new lows.

Births will top the 4-million mark for the first time, according to preliminary estimates. The expected birth rate of 25.2 per 1,000 population is the second highest in 28 years, and only 5.3 percent below the peak year of 1947. A continuing rise in the births of third, fourth, and fifth children is probably responsible for the birth increases in 1953 and 1954. No increase in births of first children was expected because of falling marriage rates since 1951.

The marriage rate sank to 9.2 per 1,000 population in the first 10 months of 1954, compared with 9.7 for the same period the year before.

MEDICAL RESEARCH GRANTS

The Public Health Service approved more than ten million dollars as Federal grants for various medical research projects. The grants are administered by the seven national institutes of health, and the Division of Research Grants of the USPHS. The present number of medical projects is 972 of which 289 are new research projects. They are distributed on the following fields:

Arthritis and metabolic diseases, 111; nervous diseases and blindness, 84; cancer, 279; dental diseases, 11; microbiological problems, 42; heart diseases, 258; mental hygiene, 69; other fields not within the scope of the seven institutes, 122.

SMALL HOSPITALS MONOGRAPH

A publication, "Appraising the Clinical Resources in Small Hospitals," gives a simple method of gathering facts on diagnostic conditions in hospitals of different sizes. The article suggests that the method may be particularly useful to nursing schools in deciding whether to include small community hospital experience in students' programs. It also is of interest to those concerned with planning hospital facilities and coordinating hospital programs.

The monograph, Public Health Service Publication No. 389, is for sale by the

Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. Price 30 cents.

DIRECT BP READING

Direct blood pressure reading is now possible by an inexpensive, portable apparatus which has been developed by the Laboratory of Technical Development of the National Heart Institute, Bethesda, Maryland.

The usual cuff and manometer method used by physicians is called the *indirect* method, and is satisfactory in the majority of cases. However, it becomes necessary at times to have the direct reading.

The apparatus has been described by Noble, Callaway, and Boone of the National Heart Institute.

Veterans Administration

Chief Medical Director—VICE ADM. JOEL T. BOONE (MC), USN, Ret.

Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

HOSPITAL MANAGER APPOINTMENTS

Dr. Arnold A. Schillinger has been appointed as manager of the 2,312 bed neuropsychiatric VA hospital at Northport, Long Island. He succeeds Dr. Roger P. Hentz, who retired December 31, 1954 after more than 32 years of Government service.

Doctor Schillinger served in the Army during World War II, and was separated with the rank of lieutenant colonel in 1946. He has been a Diplomate (in psychiatry) of the American Board of Psychiatry and Neurology, since 1946.

ANNUAL INCOME QUESTIONNAIRES

Veterans, widows and children of deceased veterans who are receiving disability and death pension are being sent annual income questionnaires which should be filled out completely and returned immediately to the office which sent them. Pension payments must be stopped for failure to return the questionnaire within 30 days.

For income purposes, payments from the Veterans Administration for disability or death, including the proceeds of GI insurance, need not be reported.

All other payments, including gifts, income from employment, payments from commercial life insurance, Social Security, annuities, and retirement benefits must be reported on the questionnaire.

New York Chapter

The Annual Business and Social Meeting of the New York Chapter was held on December 9, 1954 at the U. S. Naval Shipyard, Brooklyn, New York. The guest of honor was Brig. Gen. Perrin Long, MC, USAR.

Tributes from the floor were paid to the outgoing and incoming presidents. Captain J. Arnold de Veer, MC, USNR, gave a talk on the history of the Association of Military Surgeons, and received hearty applause for the informative and entertaining presentation.

At the business session of the meeting the following officers were elected: President, Col. Arthur L. Streeter, USAF (MC); 1st Vice-President: Brig. Gen. Crawford F. Sams, MC, USA; 2nd Vice-President: Maj. George G. Trattner, DC, USAR; Secretary: Capt. H. Easton McMahon, MC, USNR; Treasurer: Lt. Col. Hiland L. Flowers, MC, USAR.

Miscellaneous

AERO MEDICAL ASSOCIATION

The 26th annual meeting of the Aero Medical Association will be held at the Hotel Statler, Washington, D.C., March 21-23, 1955.

The scientific program will open at 11:00 a.m., Monday, March 21, with the talk, "The Changing Complex of Aviation Medicine" by Air Commodore T. C. MacDonald, Royal Air Force, London. The afternoon session on the same date will feature a special session on Space Medicine.

The Tuesday program will start at 8:40 a.m. with an address, "A Triboluminescent Micro-Accelerometer," by Dr. W. R. Franks, Banting Institute, University of Toronto.

The Wednesday morning program will have as its opening presentation "Fatal Decompression Sickness in Flight" by Dr. Webb Haymaker, Armed Forces Institute of Pathology, and Lt. Col. V. M. Downey, Air Force School of Aviation Medicine.

The closing portion of the program on Wednesday afternoon will feature a panel discussion—The Sky Unlimited—at which the participants will be leading civilian and military test pilots from Great Britain, Canada, and the United States.

The president of the Association is Brig. Gen. Otis O. Benson, Jr., USAF (MC). The General Chairman of the meeting is Colonel Robert J. Benford, USAF, (MC).

NEW DEAN HARVARD PUBLIC HEALTH SCHOOL

Dr. John C. Snyder, who has been professor and head of the Department of Microbiology of the Harvard University School of Public Health since 1946, has been appointed dean of the school, to succeed the late Dr. James S. Simmons, Brigadier General, U. S. Army, retired.

Dr. Snyder became assistant dean in July 1954. He was commissioned a major in the Army Medical Corps in 1942, and became a member of the U.S. Army Typhus Commission. He is consultant to the Public Health Service, the Veterans Administration, and the Armed Forces Epidemiological Board.

At the time of the Korean Conflict his department participated in the attempt to establish the etiology of epidemic hemorrhagic fever. Intensive work by his department did not reveal, however, the cause of that disease.

MANPOWER

The National Manpower Council, a private organization established at Columbia

University's Graduate School of Business, just published a 299-page report entitled "A Policy for Skilled Manpower." It describes the objectives and the recommendations of the Council, together with several chapters of facts and issues.

We learn from the survey of the Council that there are 8 or 9 million skilled workers in the United States and nearly a half-million technicians. These resources are available in a civilian working population of 64,000,000. Three out of every five skilled workers and technicians acquire training informally, by "picking up" skills at work through the processes of promotion and changing jobs.

The Council considers the Armed Services as a major training institution. Hence—in their opinion—compulsory military service should not be viewed primarily as an interruption in a man's education or training, nor should the Armed Forces be seen merely as users of vast numbers of trained manpower. The Services play a vital role in developing the nation's skilled and technical manpower. About half of the men in the Armed Forces receive some kind of technical training. There are many different courses that are made available to some young men who would not be able to get them in civilian life.

EFFECTS OF HUNGER AND FATIGUE

During a 24-day period 12 enlisted men and one officer were given 1,000 calories of pure carbohydrate a day, plus vitamins, and up to six cups of black coffee for the purpose of studying the reactions of the human body to low calorie intake. The daily regime of the soldiers included a five-mile walk and other exercises. Profs. Keys and Brozek of the University of Wisconsin reported that, "during the course of the tests each man steadily declined in the rapidity with which he was able to move his hand, or hands, from one spot to another, and these basic travel movements, as they are called, were more affected by the starvation than finer manipulative movements."

NEW DEAN AT WISCONSIN MEDICAL SCHOOL

Dr. John Z. Bowers, now dean of the University of Utah College of Medicine in Salt Lake City, will become dean of the University of Wisconsin Medical School, in Madison, July 1.

Dean Bowers will succeed Dr. William S. Middleton, dean of the Wisconsin school since 1935, who has asked to be relieved of his administrative duties so that he can devote his full energies to teaching and research.

At the age of 41, Dr. Bowers has built a wide reputation as administrator and radiobiologist, and has directed some of the nation's important research into effects of radiation.

Born in Catonsville, Md., he received his bachelor of science degree from Gettysburg (Pa.) College in 1933 and his M.D. degree in 1938 from the University of Maryland School of Medicine.

He served as chief of the medical branch, biological and medical division, of the Atomic Energy Commission in Washington, D.C., in 1947-48; as deputy director of the division from 1948 to 1950; and since his appointment as dean at Utah, has been a medical consultant to the director of the Atomic Energy Commission's division of biology and medicine. As commander in the Navy from 1941-45, his service earned him the Purple Heart and the Legion of Merit.

OVERCOMING FIBRILLATION OF THE HEART

Fibrillation of the heart from electric shock, frequently the cause of death among utility employees, has been overcome by the use of a single application of a 60-cycle current lasting approximately one second, with the current flowing through the chest in the direction of head to foot.

The study of overcoming this fibrillation has been a project of the Johns Hopkins University, with its Schools of Engineering and Medicine, and its Hospital participation.

Details of the study were made known at the Winter General Meeting of the Ameri-

can Institute of Electrical Engineers held in New York recently.

MEDICAL QUACKERY

The operation of the Food and Drug Administration will be surveyed by a special committee composed of the representatives of the interested industries.

Mr. George Larrick, the Commissioner, complained that his staff is too small while the number of fake medical products and devices is increasing as a result of "high powered hocus-pocus research."

Medical quackery, especially in the field of cancer, is using the "big-lie" technic to cloak its operations in the guise of legitimate research.

TAX EXEMPTION

Research and study grants from philanthropic organizations are gifts and, therefore, not taxable, according to the ruling of the Tax Court of the United States. This decision reverses an earlier ruling which considered the grant as income of the recipient.

NEW STERILIZING BAG

Something that will keep the syringe parts together during sterilization has been developed in the form of a bag with a built in indicator which changes color from white to black when the proper sterilizing conditions have been obtained.

There is no more need for mixing the plunger and the barrel of the syringe. Much time will be saved by the nurse in a busy clinic using many syringes, as this method will eliminate the matching up of barrel and plunger except at the initial cleaning.

JOBS AVAILABLE WITH CRIPPLED PERSONS

Fellowships will be granted to between 15 and 20 persons for training in the field of counseling and placement of crippled persons, as announced by the National Society for Crippled Children and Adults (the Easter Seal Society).

The training will be given at the Institute

of Physical Medicine and Rehabilitation of New York University-Bellevue Medical Center, June 20 to July 15, 1955.

These fellowships will be awarded to qualified counselors, guidance teachers, employment interviewers, placement personnel, and other professional persons working with the handicapped.

The deadline for receipt of applications is March 15. Information can be secured from the Personnel and Training Service of the National Society for Crippled Children and Adults, 11 South La Salle Street, Chicago 3, Ill.

Annual Business Meeting

The annual business meeting of the Association was held in the Presidential Ballroom of the Hotel Statler at 11:30 a.m., December 1st, 1954. The meeting was called to order by the President, Dr. Leonard A. Scheele, Surgeon General, United States Public Health Service.

The Secretary, Colonel Robert E. Bitner, made the following report: The name of the official journal of the Association will be changed from its present name, THE MILITARY SURGEON to MILITARY MEDICINE, and there will be a newly designed cover, which will also carry the words (in small type): Formerly THE MILITARY SURGEON. The need for the new name was previously explained to the Executive Council of the Association, which body approved the change. The effective date was set as January 1955, with Volume 116, No. 1. There will be no change in the numbering of the volumes.

There has been no appreciable change in the membership of the Association. A need for individual members to recruit new members was cited.

The Financial Report as prepared by the auditors showed:

(As of September 30, 1954)

<i>Assets</i>	
General Fund	\$53,762.60
Convention Fund	2,305.50

Seaman Trust Fund	8,163.66
Total Assets	64,231.76

<i>Liabilities and Net Worth</i>	
<i>Liabilities</i>	
General Fund	2,396.57

<i>Net worth</i>	
General Fund	\$51,366.03
Convention Fund	2,305.50
Seaman Trust Fund	8,163.66
	61,835.19
	<u>\$64,231.76</u>

Several new awards have come to the Association. These have been mentioned in the Presidential Address at the opening of the convention.

The Secretary's report was accepted by a motion from the floor.

The Chairman of the Membership Committee, Colonel Don S. Wenger, USAF, made a report the substance of which was that there should be a person employed to implement the suggestions of the committee. No action was taken on that suggestion. A motion to accept the report was passed.

Brig. General Leigh C. Fairbank, President of the Retirement Fund Board of Trustees, gave a detailed report on the Fund and stated that the total assets, which included cash and government bonds was \$5004.18. A motion to accept the report was passed.

The next order of business was the consideration of the proposed changes in and additions to the Constitution and By-laws of the Association. It was pointed out that these had been published in the July, September and November issues of the Association. A motion to adopt these changes was passed.

General George E. Armstrong, Surgeon General of the Army gave a brief report on the Luxembourg Congress of Military Medicine and Pharmacy held during the early part of November, 1954.

Mr. F. W. McCormick of Philadelphia, representative of the Group Health Insurance of the Association, discussed the plan of the insurance, and gave members an opportunity to ask questions.

Colonel Wm. H. Triplett, Chairman of the Resolutions Committee, presented the following resolutions which were adopted by applause:

RESOLVED: That an expression of deep appreciation be extended by the Association to the Statler Hotel for the comforts and conveniences afforded and the evident courtesies of its staff and employees.

That the thanks of the Association be given the technical exhibitors, individually and collectively, for the attractive arrangement and the cooperative and courteous manner in which exhibits were displayed.

That the scientific exhibitors receive grateful acknowledgement for their valuable contributions to the interest and success of the convention.

That the press coverage of the many important features of the convention and its program be recognized with gratitude and thanks.

That special encomiums are due Pharmacist Director Thomas A. Foster, U.S.P.H.S., Brig. Gen. Rawley E. Chambers, MC, U. S. Army, and Capt. Robert V. Schultz, MC, U. S. Navy, chairmen respectively, of arrangements, program and scientific exhibit committees. To each of them, including everyone serving with them, our sincere thanks for a job well done. And saving the best for the last—

That special notice be taken and sincere thanks given the Ladies Committee under the efficient and charming leadership of Mrs. Otis L. Anderson and including all who contributed to the planning and arranging the many and varied entertaining and instructive tours for the ladies of the association.

RESOLVED: That the sincere thanks of the association of Military Surgeons be given the following groups who gave so freely of their time and talents in contributing to the pleasure and success of the 61st Annual Convention:

U. S. Navy Band
U. S. Air Force Band
U. S. Army Band

U. S. Air Force Orchestra
Armed Forces Relief and Benefit Association.

Maj. General Alvin L. Gorby, Chairman of the Nominating Committee presented the following report:

The Nominating Committee, met on 29 November 1954. The following members were present:

Maj. General Alvin L. Gorby, USA, MC, Chairman

Dr. Horning, USN, MC, Res.

Rear Admiral O. B. Morrison, USN

Brig. General H. H. Twitchell, USAF (MC)

The Nominating Committee respectfully submits the following recommendations to the Association:

1. That Rear Admiral John Q. Owsley, MC, USN, be appointed to replace Vice Admiral Carl A. Broaddus, MC, USN, Ret. as First Vice-President succeeding Maj. General Joseph I. Martin, MC, USA.

2. That Dr. J. W. Cronin, U. S. Public Health Service, be appointed Sixth Vice-President.

The Nominating Committee recommended that no other changes be considered at this time in the nominating of Vice-Presidents.

A motion by Col. Triplett that the nominations be accepted and closed and that the Secretary be instructed to cast the unanimous ballot for the election of these officers was duly seconded and adopted. Gen. Fairbank stated that the term of office of Dr. James P. Leake as Secretary of the Retirement Fund Board of Trustees expired with the annual meeting. It was pointed out that this was a position to be filled by the Executive Council.

Col. Koontz then presented the outgoing President with a Life Membership in the Association, and the Association badge. Col. Koontz announced that the 1955 convention would be held in Washington, D.C., November 7-9.

There being no further business, the meeting then adjourned sine die.

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